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BEACH PROFILE ANALYSIS SYSTEM (BPAS). VOLUME V. BPAS USER'S GUI--ETC(U)

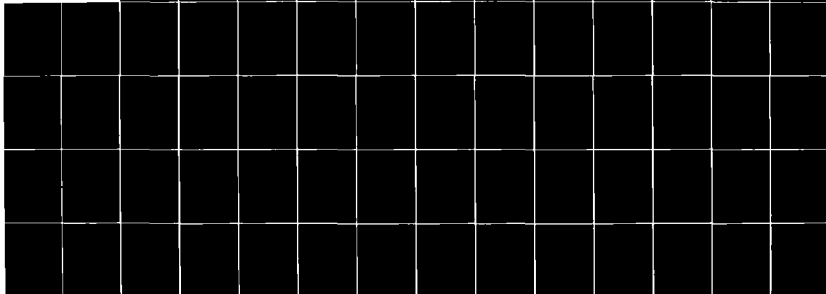
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Beach Profile Analysis System (BPAS)

Volume V

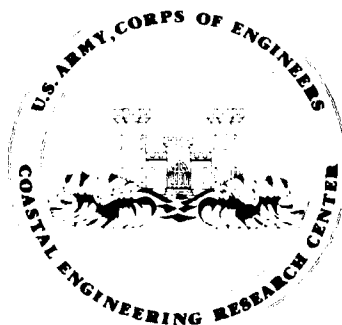
BPAS User's Guide: Analysis Module BEACH

by

Marilyn V. Fleming and Timothy J. Lawler

TECHNICAL REPORT NO. 82-1 (V)

JUNE 1982



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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A package of computer programs for editing, analyzing, and displaying beach profile survey data has been developed. The eight-volume package, named the Beach Profile Analysis System (BPAS), consists of an overview of the BPAS program, two editing programs, five analysis programs, and supporting appendices. (continued) | | |

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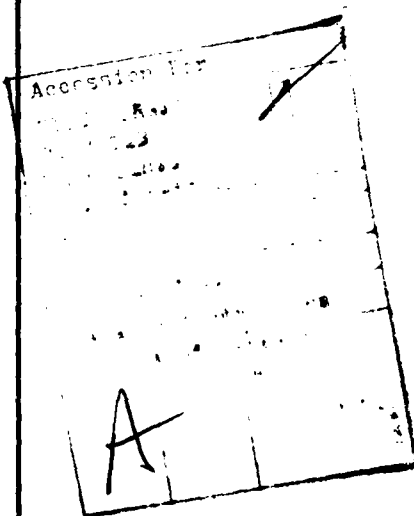
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The first editing program checks for missing or unreasonable data, surveying or note-reducing errors, and improper arrangement of data cards. The second editing program assumes that most errors have been corrected and, while it does some minor editing, its major function is to sort, reformat, and store the data on the selected permanent storage media. It is also used to update or extract data from existing files and performs some preliminary data analysis.

The analysis programs compute changes in shoreline position, selected contour positions, sand level, sand volume, and statistical trends and correlations. The results are plotted in a number of ways for display purposes. Output can be specified for English or metric units and can be referenced to any horizontal or vertical datum. Contour positions, including the shoreline position, are interpolated linearly between adjacent surveyed points on the profile. If a survey does not cross the datum elevation, but does reach a specified minimum elevation (e.g., +2 feet MSL), the shoreline position can be extrapolated using the two seawardmost points. Before computing volume changes, common bonds are established relative to the landward and seaward extent of the surveys on each profile line. The computed area under each profile is then expressed in terms of a "unit volume" for a shore-normal slice that is one unit wide. Rates of change in shoreline position and unit volume are computed by linear regression analysis.

The BPAS package has been designed for use primarily on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.



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PREFACE

This report is published to provide coastal engineers with the documentation of a package of computer programs for editing, analyzing, and displaying beach profile survey data. This package, named the Beach Profile Analysis System (BPAS), was needed for the analysis of a large data bank of field and laboratory profile surveys. The work was carried out under the U.S. Army Coastal Engineering Research Center's (CERC) Beach Profile Studies work unit, Shore Protection and Restoration Program, Coastal Engineering Area of Civil Works Research and Development.

This report (Vol. V), the fifth of eight volumes, contains user instructions for the analysis module BEACH, which produces plots and tables of unit volume and shoreline position changes.

The report was prepared by Marilyn V. Fleming and Timothy J. Lawler, Systems Analysts, under the supervision of P. Pierce, Chief, ADP Office, with the assistance of Allan E. DeWall, Geologist, under the supervision of C.J. Galvin, formerly Chief, Coastal Processes Branch, and Mr. R.P. Savage, Chief, Research Division.


Instrumental insight concerning a previous version of the Beach Profile Analysis System was provided by B. Sims. Programing was accomplished by M. Fleming and T. Lawler with the assistance of D. French, J. Alquist, R. Hylton, and F. Wilson.

The authors acknowledge the helpful discussions and review comments of Drs. C. Everts, C. Galvin, R. Hallermeier, and C. Vincent, and W. Birkemeier, M. Hemsley, A. DeWall, H.C. Miller, B. Sims, and P. Vitale.

Technical Director of CERC was Dr. Robert W. Whalin, P.E., upon publication of this report.

Comments on this publication are invited.

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TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

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CONVERSION FACTORS, U.S. CUSTOMARY TO METRIC (SI) UNITS OF MEASUREMENT

U.S. customary units of measurement used in this report can be converted to metric (SI) units as follows:

| Multiply | by | To obtain |
|--------------------|-------------------------|---|
| inches | 25.4 | millimeters |
| | 2.54 | centimeters |
| square inches | 6.452 | square centimeters |
| cubic inches | 16.39 | cubic centimeters |
| feet | 30.48 | centimeters |
| | 0.3048 | meters |
| square feet | 0.0929 | square meters |
| cubic feet | 0.0283 | cubic meters |
| yards | 0.9144 | meters |
| square yards | 0.836 | square meters |
| cubic yards | 0.7646 | cubic meters |
| miles | 1.6093 | kilometers |
| square miles | 259.0 | hectares |
| knots | 1.852 | kilometers per hour |
| acres | 0.4047 | hectares |
| foot-pounds | 1.3558 | newton meters |
| millibars | 1.0197×10^{-3} | kilograms per square centimeter |
| ounces | 28.35 | grams |
| pounds | 453.6 | grams |
| | 0.4536 | kilograms |
| ton, long | 1.0160 | metric tons |
| ton, short | 0.9072 | metric tons |
| degrees (angle) | 0.01745 | radians |
| Fahrenheit degrees | 5/9 | Celsius degrees or Kelvins ¹ |

¹To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use formula: $C = (5/9) (F - 32)$.

To obtain Kelvin (K) readings, use formula: $K = (5/9) (F - 32) + 273.15$.

BEACH PROFILE ANALYSIS SYSTEM (BPAS)

Volume V. BPAS User's Guide: Analysis Module BEACH

by
Marilyn V. Fleming and Timothy J. Lawler

I. INTRODUCTION

This report, the fifth of eight volumes, provides user instructions for processing analysis module BEACH, a part of the Beach Profile Analysis System (BPAS). (Fig. 1). The BPAS is a package of computer programs which edit and analyze beach profile data. The objective of the analysis is to compute and display changes in unit volume, shoreline position, and profile geometry. BEACH displays beach profile changes, through time, at a locality by providing tabular and graphical displays of shoreline and unit volume changes. The module also displays the results of linear regression analysis correlating shoreline and unit volume changes with time and with one another.

Volumes I and VIII contain information concerning data collection, formatting and restrictions, and program computations, assumptions, and error messages not repeated in this volume. It is recommended that Volumes I and VIII be used in conjunction with this volume. Volume II, which is a user's guide for processing the editing routines, EDIT1 and EDIT2, contains guidelines for the initial preparation of survey data. These guidelines are not repeated in this volume. Other volumes available in the series are:

(a) Volume III, "BPAS User's Guide: Analysis Module SURVY1," which produces comparative plots of beach profiles.

(b) Volume IV, "BPAS User's Guide: Analysis Module SURVY2," which produces plots and tables of contour positions.

(c) Volume VI, "BPAS User's Guide: Analysis Module VOLCTR," which produces tables and plots of change in unit volume between specific contour segments.

(d) Volume VII, "BPAS User's Guide: Analysis Module ELVDIS," which produces tables and plots of change and maximum and minimum elevations at specific distances.

Each of these volumes contains instructions for processing only the module with which it is concerned.

II. PROGRAM DESCRIPTION

The survey input data processed by program BEACH (Fig. 2) are assumed to have already been processed through the editing routines, EDIT1 and EDIT2. These edit routines perform a thorough edit and a partial analysis of the data. The result of this preliminary analysis is contained on the first record in the survey data input file, the header record. The information on the header record, along with information specifying desired outputs and optional data specifications, is used to determine whether the data will exceed the program capabilities. If capabilities will be exceeded or the job has been improperly set up, BEACH will print an appropriate error message and stop execution after this initial test. Otherwise, the program will continue.

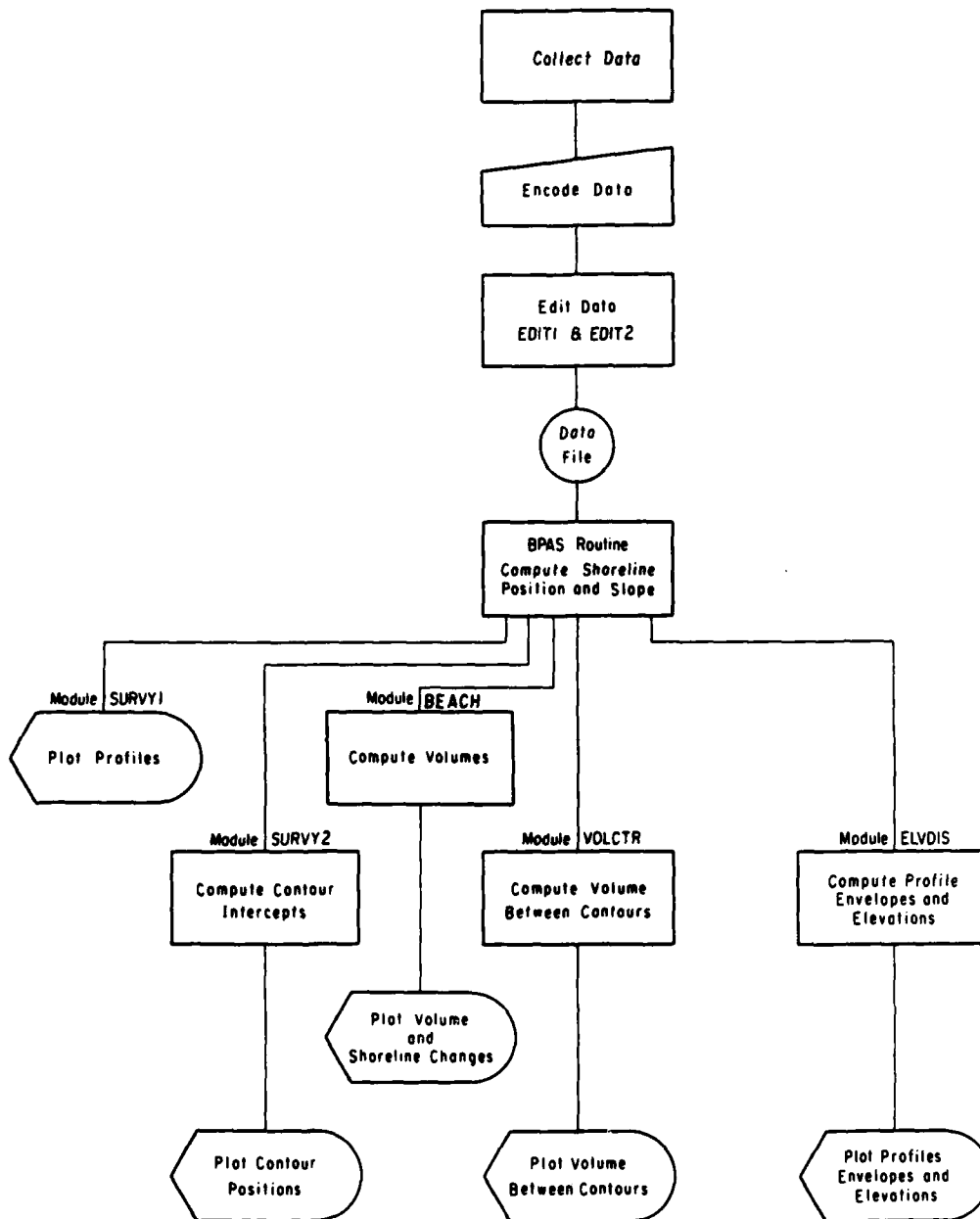


Figure 1. Beach Profile Analysis System.

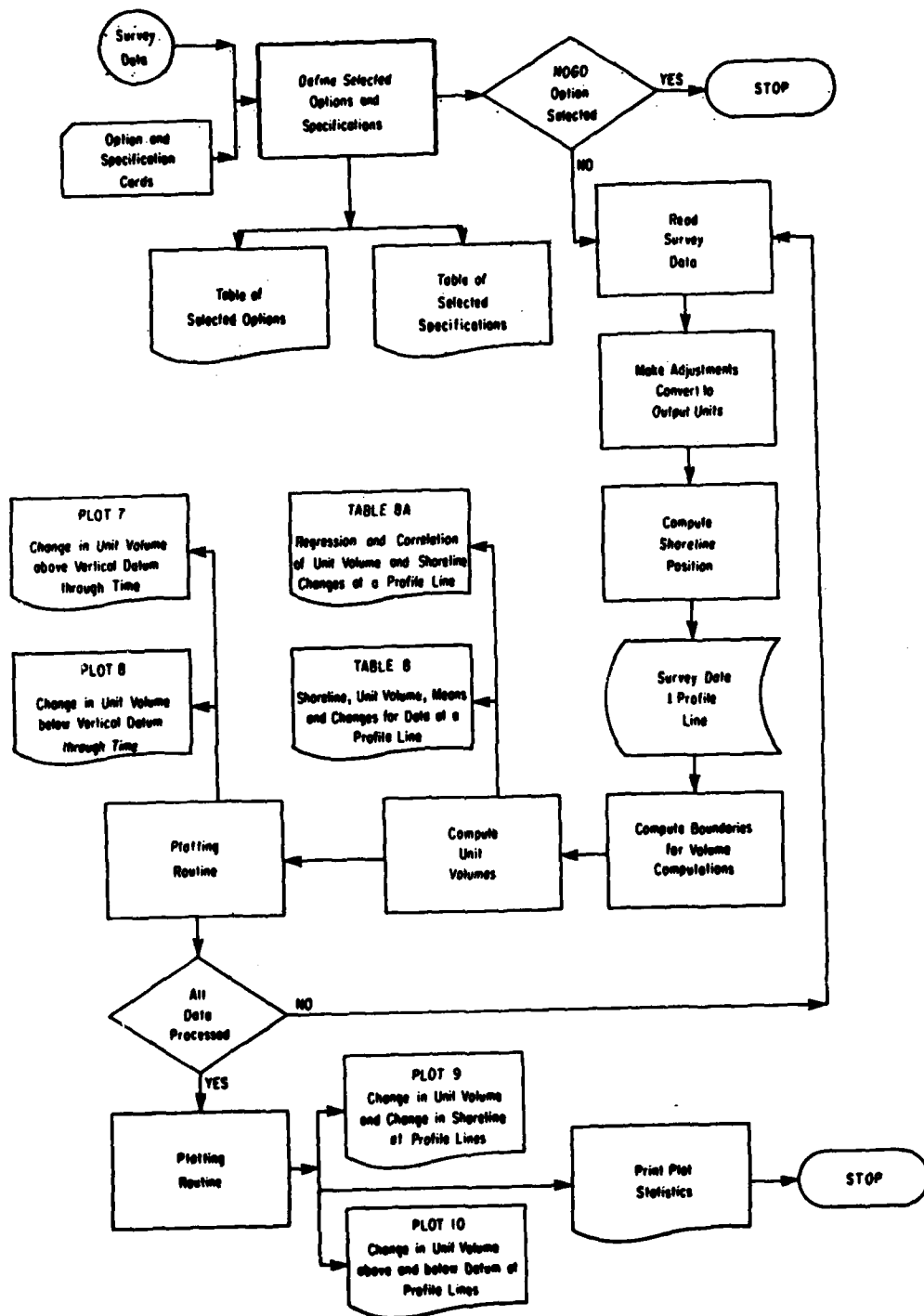


Figure 2. Analysis module BEACH.

BEACH reads the survey input data, finds the shoreline position, computes unit volume above and below datum, and produces the requested plot or table outputs. Records are read from the survey input data file, requested adjustments to the vertical or horizontal coordinates are made, and the coordinates are converted to output units of measurement. The distance to the shoreline position is computed and this point is added to each record if it is not a surveyed coordinate. Once all data for a single profile line have been processed, the reference shoreline position, the mean shoreline position, the appropriate boundaries for unit volume computations, the reference unit volume, the unit volumes, the mean unit volume, and the changes in shoreline and unit volume are computed. Outputs pertaining to each profile line are produced and regression analysis is performed before the data for the next line are read. If the reference shoreline position or reference unit volume above datum for any profile line cannot be computed (e.g., no shoreline position defined during selected reference survey or profile begins too far seaward to qualify for unit volume computations during the reference survey), there will be no output for that line except a message to inform the user.

Outputs for all profile lines are produced after all the data have been read. When these outputs are completed, plot statistics (number of each type of plot produced) are written.

III. HARDWARE AND SOFTWARE REQUIREMENTS

BEACH is written in extended FORTRAN IV and was designed to take advantage of processing features available on the Control Data Corporation 6600, Cyber 176 or equivalent computer. Such features include the 10-character, 60-bit word size, the FORTRAN-callable sort routine (interfacing with the NOS or NOS/BE operating system SORTMRG utility), and the utility subroutines and functions DATE, TIME, EOF (to check for end of data file), FLOAT, IFIX, ABS, MOD, and the maximum and minimum functions.

General processing requirements include the 500 series CALCOMP plotting instructions, block data subroutines, ENCODE, DECODE, variable dimensions in subroutines, 132-position line printer, a plotter, and 66,000 (decimal) words of core. Also required are the capabilities to process variable length records of up to 635 characters, to perform unformatted reads and writes, to access up to five unique units for input and output, and to use variable formats and variable input and output units in FORTRAN READ and WRITE statements.

A single run producing all available outputs using the input data listed in Appendix G of Volume VIII, 15 surveys of 12 profile lines, required an average of 38,000 words of core and 16 CPU seconds of processing time. There were 24 pages of output and 56 plots. The job created about 4,500 plot cards. The program is dimensioned to process up to 150 surveys of 100 profile lines, each defined with up to 60 coordinate pairs. The restrictions on number of surveys, profile lines, and coordinate pairs can be changed; however, a discussion of the method for doing so is outside the scope of this report.

IV. INPUT DATA

The input data consist of survey records which have been carefully edited and properly formatted by the EDIT1 and EDIT2 programs (see Vol. II). The first record in the survey data file, the header record (Table 1), supplies the range of profile line numbers, survey numbers, and dates. It specifies in

Table 1. Format of the header record.

| Position No. | Entry description | FORTTRAN format |
|--------------|--|-----------------|
| 1-2 | 00 | A2 |
| 3-5 | Lowest profile line number in data file | I3 |
| 6-9 | Lowest survey identification number in data file | I4 |
| 10-12 | Highest profile line number in data file | I3 |
| 13-16 | Highest survey identification number in data file | I4 |
| 17-19 | Maximum number coordinate pairs required to define any one survey | I3 |
| 20 | Number of places to the right of the decimal for distance coordinates | I1 |
| 21 | Number of places to the right of the decimal for elevation coordinates | I1 |
| 22-23 | Two-character abbreviation for units of measurement in which data are recorded | A2 |
| 24-27 | Four-character acronym describing the vertical datum to which data are referenced | A4 |
| 28-49 | Range of dates, including time, covered by data (yr(I2), mon(I2), d(I2, hr(I3), min(I2)) | 2(3I2,I3,I2) |
| 50-80 | Data description (31 characters) | 31A1 |

what units of measurement the data are recorded, where the decimal should be in the distance and elevation coordinates, and to what vertical datum the data are recorded. This record also contains a 31-character data description. This information is as supplied to or computed by the EDIT2 program. If the information on the header record indicates that the data will exceed any of the program dimensions, an error message is printed and program execution is stopped.

The survey data file, from magnetic media (Table 2) or card images (Table 3), must be sorted by profile line number and then survey number. The module ignores locality codes so all data on a single file should be from the same locality.

V. MODULE OUTPUTS

BEACH will produce two tabular and four graphical displays, referred to as TABLE8, TABLE8A, PLOT7, PLOT8, PLOT9, and PLOT10. Any or all of these may be produced during a single run. The default specifications for these outputs have been designed so that they may be published without requiring redrafting. In addition, tables of selected options and processing and output specifications are produced by each run of each analysis module. The plot statistics are produced by the analysis modules when plot output has been requested. A footnote or plot legend, "X EXTRAPOLATED DATUM," will appear only if the user

Table 2. Format of final data file--recorded on magnetic media.

| Position No. | Entry description | FORTTRAN format |
|--------------|---|-----------------|
| 1-2 | Locality code | A2 |
| 3-5 | Profile line number | I3 |
| 6-9 | Survey identification number | I4 |
| 10-15 | Date of survey | 3I2 |
| 16-20 | Time of survey | I3,I2 |
| 21-23 | Number of coordinate pairs in the record | I3 |
| 24-28 | Minimum elevation on the record | I5 |
| 29-35 | Blank | 7X |
| 36-end | Distance and elevation coordinate pairs, five positions per coordinate, no decimal | I5 |

Table 3. Format of final data file--card image data.

| Position No. | Entry description | FORTTRAN format |
|---|--|-----------------|
| First card in each record | | |
| 1-2 | Locality code | A2 |
| 3-5 | Profile line number | I3 |
| 6-9 | Survey identification number | I4 |
| 10 | Card number (1) | A1 |
| 11-16 | Date of survey | 3I2 |
| 17-21 | Time of survey | I3,I2 |
| 22-24 | Number of coordinate pairs in the record | I3 |
| 25-29 | Minimum elevation this record | I5 |
| 30-40 | Blank | |
| 41-80 | First four distance, elevation coordinate, five columns each coordinate, no decimals ¹ | 8I5 |
| Second and following cards in each record | | |
| 1-9 | Same as for first card | |
| 10 | Card number (1-9, then A-Z) | A1 |
| 11-80 | Seven distance, elevation coordinate pairs, five positions each coordinate | 14I5 |

¹Position of decimal is defined on the header record (see Table 5).

NOTE.--If there are exactly four coordinate pairs (first card only needed, filled to position 80), the second and the last card in the record must be a blank card.

has elected to allow extrapolation of the shore line position. Every output variable computed using an extrapolated datum is identified by an "X." Sample outputs in the following figures have been photo-reduced.

The boundaries used in unit volume computations are written on the tabular outputs only. Whenever a volume, shoreline position, or change cannot be computed, blanks appear on the tables. There are no plot outputs for these surveys. When there are insufficient data to perform regression analysis (all required variables must be defined on at least two surveys), a message to that effect is written in place of the output variable.

Surveys are identified by date. If requested, the time of the survey is also written. When there is more than one profile line involved, the date used is that associated with the profile line having the largest line number (e.g., range of dates in title of PLOT9 and PLOT10).

Time-elapsed is the independent variable for regression analysis and the independent axis for plot outputs. At the user's option, this may be expressed in hours, days, months, or years. When months are selected, only 1 year's data are displayed on each plot. Enough plots will be output to depict all data.

1. Table of Options Selected (Fig. 3).

This table, produced after all option cards have been read by the program, prints the value assigned to each variable which can be defined on an option card. This table should be examined to ensure that the values assigned to these variables are as anticipated.

2. Table of Specifications Selected (Fig. 4).

This table is produced after all special processing and output selection specifications have been read by the program. User should ensure that anticipated processing specifications and outputs match those actually selected.

3. TABLE8 (Fig. 5).

For each profile line this table displays:

(a) Distance to output horizontal datum from input horizontal datum.

(b) Distance to mean shoreline position from output horizontal datum.

(c) Mean unit volume above vertical datum.

(d) Mean unit volume below vertical datum.

(e) Boundaries for volume computations.

Then, for each survey of the profile line the table displays:

(a) Survey date and, if specified, time.

U P I I O N S HAM MUN 02/12/81 AT 11.48.00.

ANALYSIS MULTIPLE SELECTED== BEACH

USER SELECTED MUN ID== HAM

LOCALITY DESCRIPTION IS TEST BEACH

EACH SURVEYED LINE WILL BE CALLED A PROFILE

INPUT DISTANCES ARE COMPUTED FROM THE BENCHMARK

INPUT DISTANCES TO FT X 100000, ELEVATIONS TO FT X 100001

VERTICAL DATUM IS MSL
A CORRECTION OF 0.000 FT WILL BE MADE TO EACH VERTICAL COORDINATE.

TIME WILL APPEAR ON OUTPUT. 24-HOUR SYSTEM WILL BE USED.

HORIZONTAL DATUM IS
THE SIGHTLINE POSITION ON
REFERENCE SURVEY
THERE ARE NO MORE THAN 2 PROFILE LINES.
THE INITIAL SURVEY OF EACH PROFILE LINE WILL BE THE REFERENCE SURVEY.

UNIT VOLUME ABOVE DATUM==

ZERO VOLUME ABOVE IS
THE UNIT VOLUME ON
REFERENCE SURVEY
THERE ARE NO MORE THAN 2 PROFILE LINES.
THE INITIAL SURVEY OF EACH PROFILE LINE WILL BE THE REFERENCE SURVEY.
PROFILE MUST BEGIN NO MORE THAN 120,000 FT SEWARD OF BENCHMARK TO BE CONSIDERED FOR VOLUME COMPUTATIONS.

VOLUME BELOW DATUM==

ZERO VOLUME BELOW IS
THE UNIT VOLUME ON
REFERENCE SURVEY
THERE ARE NO MORE THAN 2 PROFILE LINES.
REFERENCE SURVEY NUMBER IS 18
PROFILE MUST END NO LESS THAN 1511,000 FT SEWARD OF SELECTED HORIZONTAL DATUM TO BE CONSIDERED FOR VOLUME COMPUTATIONS.

A CONVERSION FACTOR OF 1.00000 WILL BE USED TO GO FROM INPUT UNITS (FT) TO OUTPUT UNITS (FT)
A CONVERSION FACTOR OF .03704 WILL BE USED TO GO FROM SQUARE FT TO YD3/FT

EXTRAPOLATION WILL BE DONE TO MSL IF THE LAST SURVEYED POINT REACHES A MINIMUM ELEVATION OF 2,000 FT

SURVEY INPUT DATA WILL BE READ FROM UNIT 7 IN THIS FORMAT==
(24,13,14,3,12,13,12,13,15,0,7X,120FS,0)

Figure 3. Sample BEACH output--table of options selected.

SPECIFICATIONS SELECTED FOR ANALYSIS MODULE BEACH MAH RUN 02/12/81 AT 11.48.40.

TABLE 8 WILL BE OUTPUT.
TABLE 8A WILL BE OUTPUT.
TIME MEASURED AND DISPLAYED IN MONTHS
UPPER LIMIT FOR VOLUME COMPUTATIONS IS PROFILE SURFACE.
LOWER BOUNDARY FOR VOLUME COMPUTATIONS IS -100.000 FT FROM MSL
SLOPE OF REGRESSION LINE FOR SHORELINE CHANGES WILL BE IN FT/MONTH
SLOPE OF REGRESSION LINE FOR VOLUME CHANGES WILL BE IN YD3/FT/MONTH
NO PLOT OUTPUT.

Figure 4. Sample BEACH output--specifications selected.

MAN RUN 03/05/81 AT 16:22.59, PAGE 8

UNIT VOLUME (YDS/FT), DISTANCE (FT) TO SHORELINE AND CHANGES AT PROFILE LINE 8
AT TEST BEACH

01JAN79/ 10.00=1000000/ 0.00

REFERENCE HORIZONTAL DATUM IS THE SHORELINE POSITION ON 01JAN79/ 13.00
REFERENCE ZERO VOLUME ABOVE IS THE UNIT VOLUME ON 01JAN79/ 13.00
REFERENCE ZERO VOLUME BELOW IS THE UNIT VOLUME ON 01JAN79/ 13.00

DISTANCE FROM BENCHMARK TO HORIZONTAL DATUM 300.0 (FT)
DISTANCE TO MEAN SHORELINE POSITION FROM HORIZONTAL DATUM 16.8 (FT)
MEAN UNIT VOLUME ABOVE MBL 100.222 (YDS/FT)
MEAN UNIT VOLUME BELOW MBL 1200.221 (YDS/FT)

| SURVEY DATE/TIME | MONTHS SINCE LAST SURVEY | SHORELINE POSITION | | | | UNIT VOLUME ABOVE IS | | | | UNIT VOLUME BELOW IS | | | |
|------------------|--------------------------|-------------------------|--------------------------------|-----------------------------|-------------|-----------------------|----------------------|-----------------------|-------------|-----------------------|----------------------|-----------------------|-------|
| | | DISTANCE FROM BENCHMARK | DISTANCE FROM HORIZONTAL DATUM | CHANGE FROM PREVIOUS SURVEY | CUBIC YD/FT | CHANGE FROM REFERENCE | CHANGE FROM PREVIOUS | CHANGE FROM REFERENCE | CUBIC YD/FT | CHANGE FROM REFERENCE | CHANGE FROM PREVIOUS | CHANGE FROM REFERENCE | DATUM |
| 01JAN79/ 13.00 | 0.0 | 340.0 | 0.0 | | 161.026 | 0.000 | | | 1296.001 | 0.000 | | | |
| 24APR79/ 13.00 | 1.07 | 331.7 | 11.7 | 11.7 | 102.039 | .833 | .833 | .833 | 1296.206 | .206 | .206 | .206 | |
| 20APR79/ 13.00 | 1.07 | 334.2 | 14.2 | 2.5 | 102.039 | .870 | .870 | .870 | 1296.206 | .206 | .206 | .206 | |
| 2JUN79/ 12.00 | 1.12 | 330.9 | 19.9 | 5.7 | 163.907 | 2.173 | 1.902 | 1.902 | 1296.206 | .206 | .206 | .206 | |
| 2JUL79/ 12.00 | 1.07 | 330.0 | 10.0 | -1.0 | 102.039 | 1.000 | -1.003 | -1.003 | 1296.206 | .206 | .206 | .206 | |
| 28SEP79/ 10.00 | 2.27 | 361.0 | 31.0 | 3.0 | 100.408 | 2.441 | 3.361 | 3.361 | 1296.206 | .206 | .206 | .206 | |
| 20OCT79/ 9.00 | 1.47 | 365.7 | 25.7 | 4.7 | 100.408 | 2.290 | 3.361 | 3.361 | 1296.206 | .206 | .206 | .206 | |
| 20NOV79/ 10.00 | .97 | 365.0 | 25.0 | .7 | 100.408 | 2.290 | 3.361 | 3.361 | 1296.206 | .206 | .206 | .206 | |
| 01JAN79/ 13.00 | 1.37 | 355.6 | 15.6 | -9.3 | 100.408 | 5.839 | 2.330 | 2.330 | 1296.206 | .206 | .206 | .206 | |
| 11MAR79/ 11.00 | 2.27 | 303.4 | 23.4 | 6.8 | 100.408 | 7.330 | 2.330 | 2.330 | 1296.206 | .206 | .206 | .206 | |
| 7APR79/ 0.00 | .67 | 372.3 | 22.3 | 9.0 | 100.408 | 6.740 | .599 | .599 | 1296.206 | .206 | .206 | .206 | |
| 01JUN79/ 10.00 | 2.17 | 365.2 | 25.2 | -7.2 | 100.408 | 6.022 | -2.718 | -2.718 | 1296.206 | .206 | .206 | .206 | |
| 03JUL79/ 10.00 | 1.0 | 330.0 | -8.0 | -20.2 | 100.408 | .248 | -3.778 | -3.778 | 1296.077 | -.013 | -.013 | -.013 | |
| 27SEP79/ 10.00 | 2.6 | 331.0 | -8.1 | 1.0 | 100.408 | -0.838 | -5.074 | -5.074 | 1295.508 | -.490 | -.490 | -.490 | |
| 10DEC79/ 9.00 | 2.07 | 300.1 | 20.1 | 36.2 | 103.003 | 1.019 | 6.083 | 6.083 | 1296.206 | .206 | .206 | .206 | |

BOUNDARIES
ELEVATION
AND
DISTANCE

MBL TO 22.20 FT ABOVE MBL
MOST SEAWARD MBL INTERCEPT TO
0.00 FT FROM BENCHMARK

MBL TO -100.00 FT BELOW MBL
0.00 FT FROM BENCHMARK TO
10.00 FT FROM HORIZONTAL
DATUM

Figure 5. Sample BEACH output--TABLE8.

- (b) Time elapsed between surveys of a profile line.
- (c) Distance to shoreline position from the input horizontal datum.
- (d) Distance to shoreline position from the output horizontal datum.
- (e) Distance to the shoreline position from its position during the previous survey.
- (f) Total unit volume above vertical datum.
- (g) Change in unit volume above vertical datum from some reference unit volume.
- (h) Change in unit volume above vertical datum from one survey to the next.
- (i) Items f, g, and h are also displayed for unit volume below vertical datum when the option for such computations has been selected (option card 6).

There is one table for each profile line. The number of surveys determines the number of pages per table. Data for up to 26 surveys will be written on each page.

4. TABLE8A (Fig. 6).

This output provides the following for each profile line:

- (a) Boundaries used for volume computations.
- (b) Correlation coefficients for change in unit volume above the vertical datum to change in shoreline positions from (1) the values during the previous survey and (2) the selected reference values.
- (c) Correlation coefficients for change in unit volume above the vertical datum to change in unit volume below the vertical datum from (1) the unit volumes during the previous survey and (2) the selected reference unit volumes.
- (d) Equation of the least squares fit regression line for change in shoreline position versus elapsed time.
- (e) Equation of the least squares fit regression line for change in unit volume above the vertical datum from the selected reference unit volume versus elapsed time.
- (f) Equation of the least squares fit regression line for change in unit volume below the vertical datum from the selected reference unit volume versus elapsed time.

There is one table of one page produced for each profile line.

STATISTICAL CORRELATIONS FOR 15 SURVEYS OF PROFILE LINE 00
AT TEST BEACH
27JUL77/1400 - 22FAN79/1515

REFERENCE HORIZONTAL DATUM IS
THE SHORELINE POSITION ON
28JUL77/1000

REFERENCE ZERO VOLUME ABOVE IS
THE UNIT VOLUME ON
28JUL77/1000

REFERENCE ZERO VOLUME BELOW IS
THE UNIT VOLUME ON
21OCT77/1450

CORRELATION COEFFICIENTS

| | FROM PREVIOUS SURVEY | FROM REFERENCE |
|---|----------------------------|-------------------|
| CHANGE IN UNIT VOLUME (YD3/FT) ABOVE MBL VS. SHORELINE POSITION (FT) | .4030 | .7085 |
| CHANGE IN UNIT VOLUME (YD3/FT) ABOVE MBL VS. CHANGE IN UNIT VOLUME (YD3/FT) BELOW MBL | .2447 | .3396 |

EQUATION OF REGRESSION LINE (LEAST SQUARES FIT)

CHANGE IN SHORELINE POSITION VS. ELAPSED TIME

SLOPE OF REGRESSION LINE IS -.0575 FT/ DAY INTERCEPT AT -9.6411 FT

CHANGE IN UNIT VOLUME ABOVE MBL VS. ELAPSED TIME

SLOPE OF REGRESSION LINE IS -.0111 YD3/FT/ DAY INTERCEPT AT 1.2406 YD3/FT

CHANGE IN UNIT VOLUME BELOW MBL VS. ELAPSED TIME

SLOPE OF REGRESSION LINE IS .1144 YD3/FT/ DAY INTERCEPT AT -19.5600 YD3/FT

BOUNDARIES

ELEVATION
AND
DISTANCE

MBL TO 23.50 FT ABOVE MBL

MOST SEWARD MBL INTERCEPT TO
120.00 FT FROM BENCHMARK
DATUM

MBL TO 100.00 FT BELOW MBL

120.00 FT FROM BENCHMARK TO
1527.64 FT FROM HORIZONTAL
DATUM

Figure 6. Sample BEACH output--TABLE8A.

5. PLOT7 (Fig. 7).

This plot displays the change in unit volume above the vertical datum with time. There will be at least one plot for each profile line. If time is expressed as months, there will be as many plots per profile line as there are years in the data set.

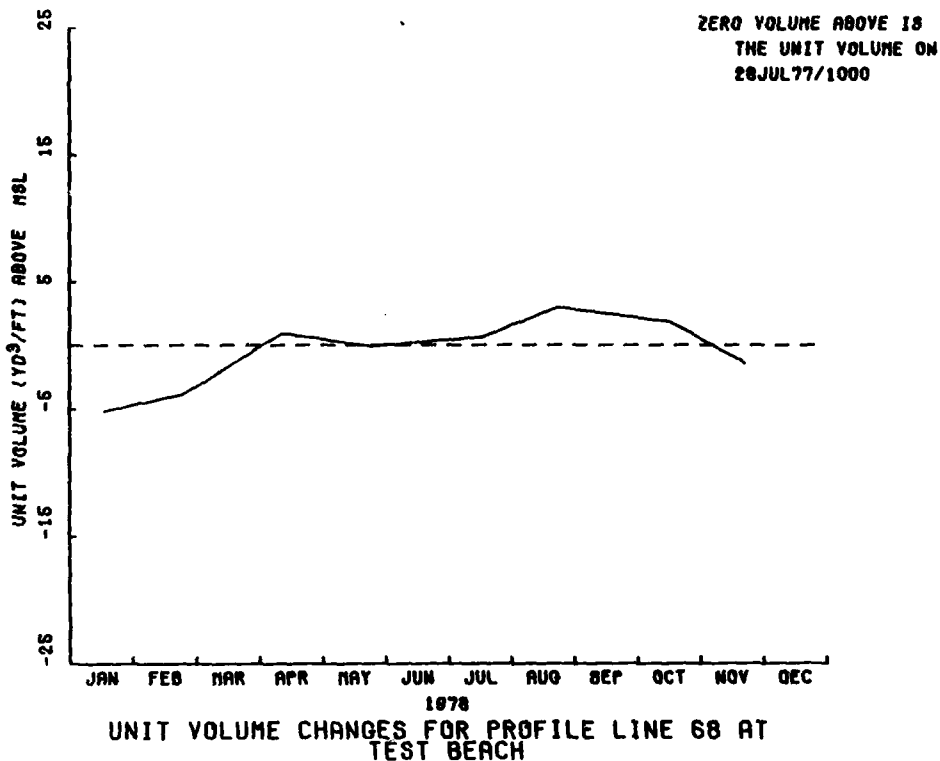


Figure 7. Sample BEACH output--change in unit volume above datum with time.

6. PLOT8 (Fig. 8).

This output shows change in unit volume below vertical datum with time. There will be at least one plot per profile line unless time is expressed as months. In this case, there will be as many plots per profile line as there are years in the data set.

7. PLOT9 (Fig. 9).

This scatter plot depicts change in unit volume between consecutive surveys. Volume above vertical datum is on the vertical axis, volume below is on the horizontal. Up to 10 profile lines, each represented by a different

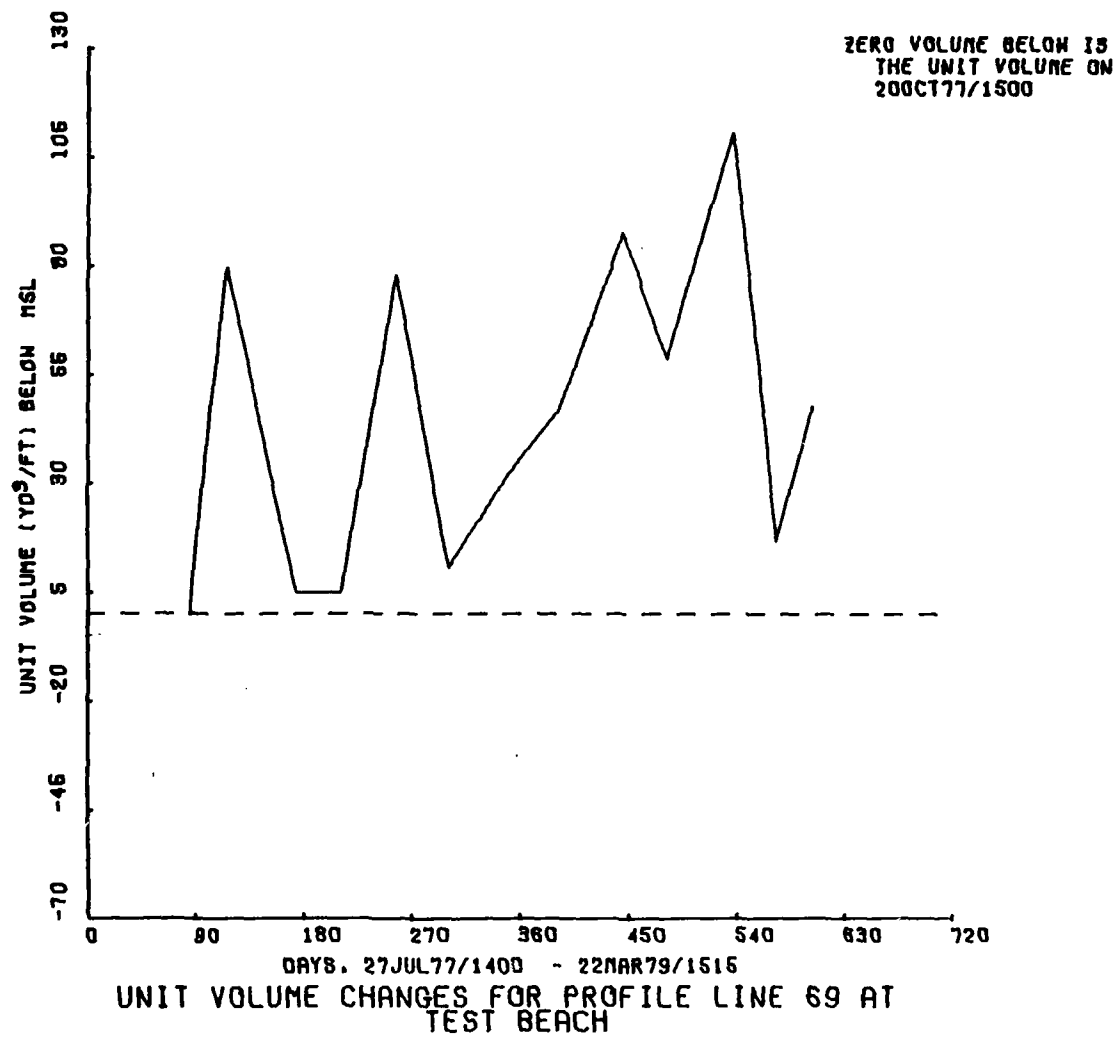


Figure 8. Sample BEACH output--change in unit volume below datum with time.

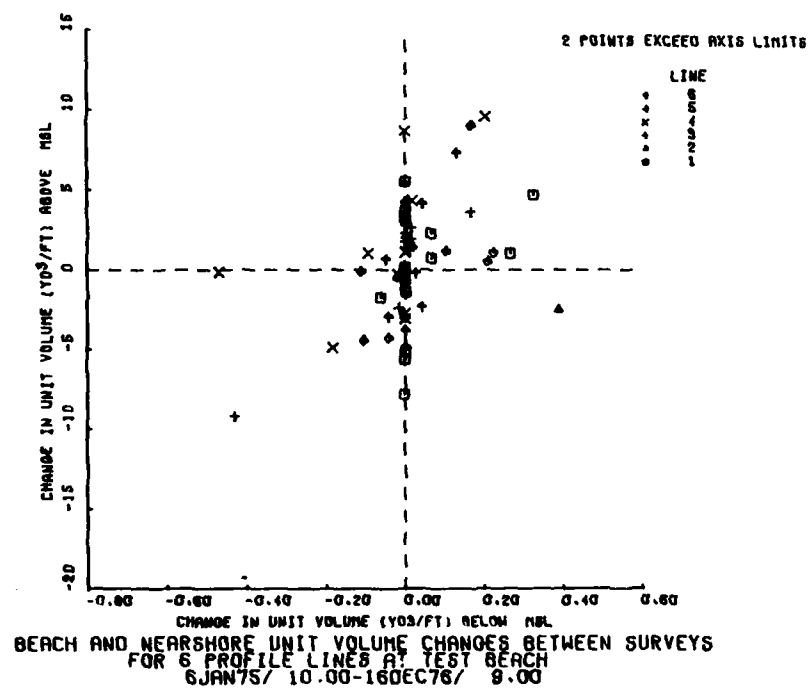
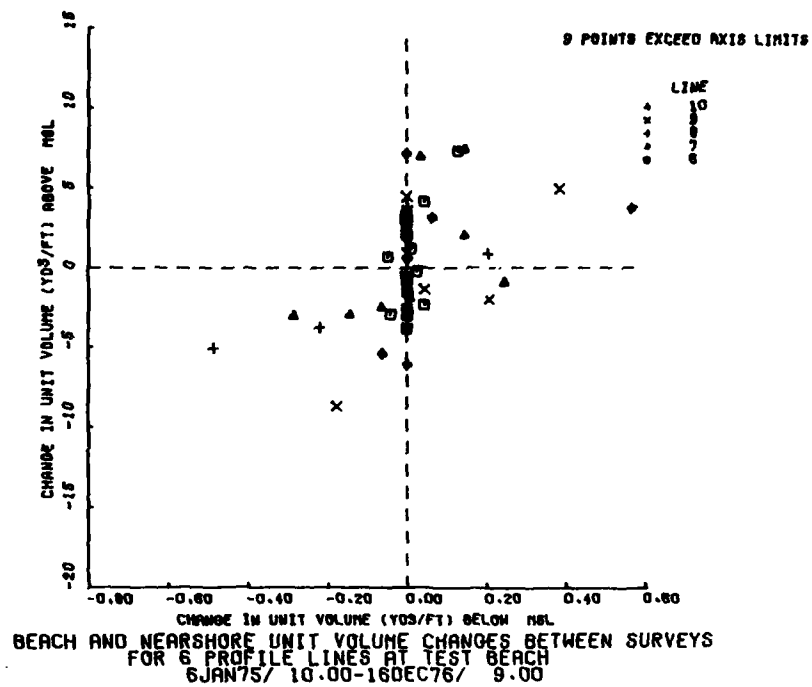


Figure 9. Sample BEACH output--change in unit volume above datum to change in unit volume below datum.

symbol, may be displayed on a single plot. The number of data points representing a change outside the axis limits is written in the plot legend. Such points are not plotted. The number of plots produced depends on the number of profile lines represented on a single plot. When more than one plot is required, the plots may be overlapped so that the last profile line represented on one plot will be the first displayed on the next.

8. PLOT10 (Fig. 10).

This scatter plot depicts the change in unit volume versus the change in shoreline position between consecutive surveys. Change in unit volume above vertical datum is on the vertical axis, change in shoreline position is on the horizontal. Up to 10 profile lines, each represented by a different symbol, may be displayed on a single plot. The number of data points outside the axis limits is written in the plot legend. Such points are not plotted. The number of plots produced depends on the number of profile lines displayed on a single plot. When more than one plot is required, the plots may be overlapped so that the last profile line represented on one plot will be the first displayed on the next.

9. PLOT Statistics (Fig. 11).

At the end of each run for which PLOT7, PLOT8, PLOT9, or PLOT10 output was requested, there is a printed table of the number of sets of axes drawn for each type of plot. This information may be used to determine how many plots to expect.

VI. JOB STRUCTURE

The job structure for each of the analysis modules is the same (Fig. 12). The only required system separators are those following the system job control cards and signaling the end of the job. The Appendix contains record layouts for each of the option, processing, and output specification cards used by module BEACH. The option and processing specification cards are optional unless unit volume below datum is to be computed. If the processing specification cards are absent, the module assigns default values. The output specification cards are required only to identify which outputs are desired; there is a default set of specifications for each BEACH output. The format and defaults for the option and processing specification cards are described in paragraphs 3, 4, and 5 of this section. Note that the option and specification cards must be followed by a blank card to signal the end of the cards to be read. The inclusion of option, processing, and output specification cards used by modules other than BEACH have no effect on processing; they are ignored.

The following contains formats for the records needed to run the module. It is recommended that data be right-justified; i.e., the rightmost character or number always occupies the rightmost position in the field. This will ensure that extra zeros are not added to the end of numeric entries when they are read by the module.

1. Program Identification Cards.

The program identification card (Table 4) is mandatory. It allows the user to assign a name to each run, defines which analysis module is to be processed, and provides the option to halt execution after the tables of selected options, processing, and output specifications have been printed.

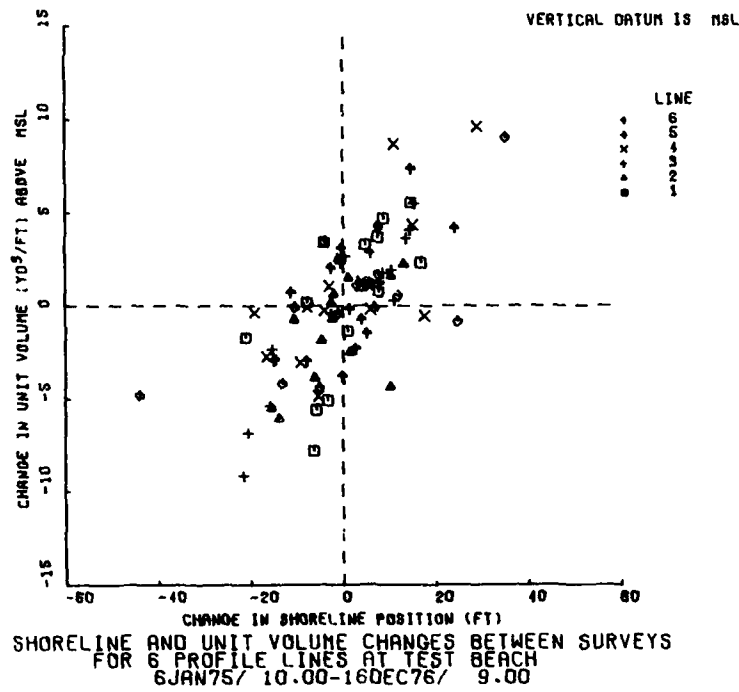
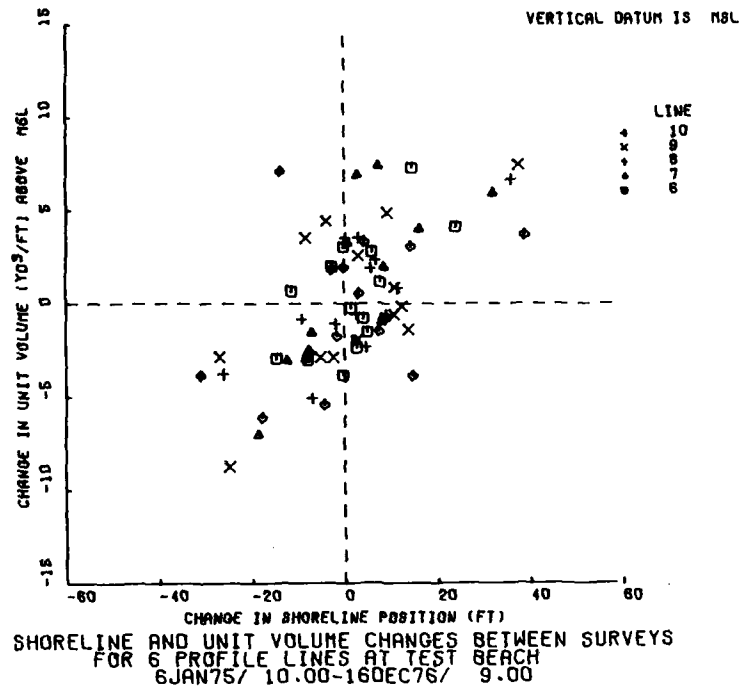
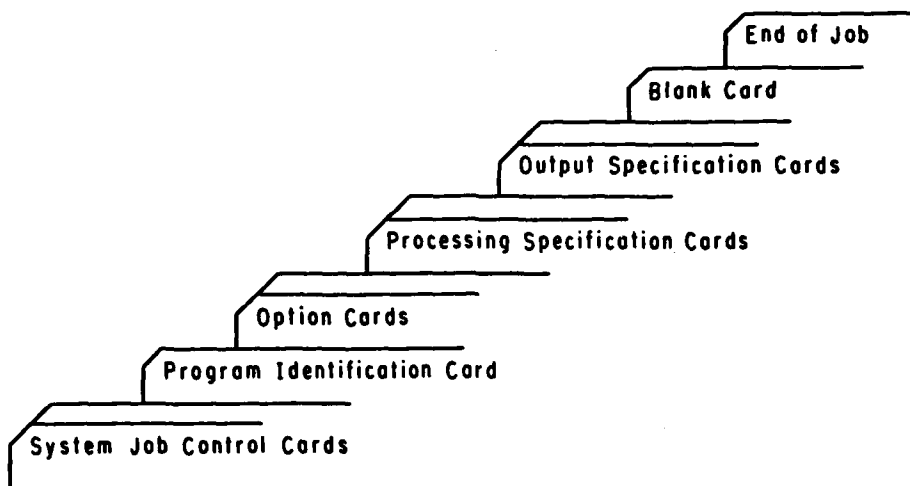


Figure 10. Sample BEACH output—change in unit volume above datum to change in shoreline.

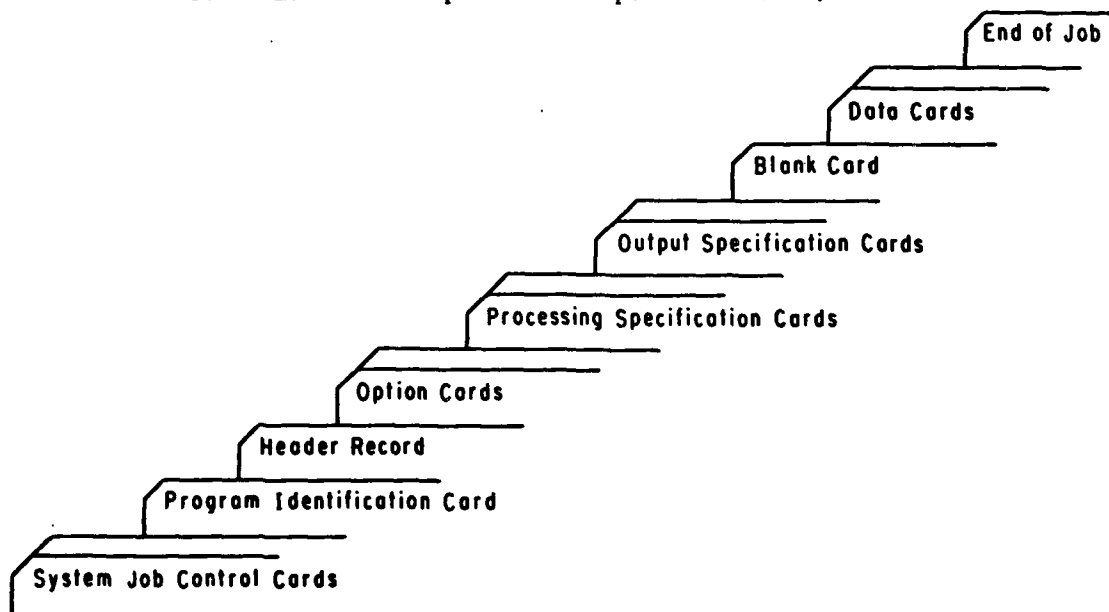
THIS RUN GENERATED THE FOLLOWING GRAPHIC OUTPUT.

| PLOT TYPE | NUMBER OF PLOTS |
|-----------|-----------------|
| ----- | ----- |
| 9 | 2 |
| 10 | 10 |

Figure 11. Sample BEACH output--plot statistics.



(1) Data on magnetic media. (Survey data file not read from from same unit as options and specifications.)



(2) Data on cards or card images. (Survey data file will be read from the same unit as the options and specifications.)

Figure 12. Job structure.

Table 4. Program identification card.

| Position No. | Entry description | Default value | FORTTRAN format |
|--------------|--|----------------------|-----------------|
| 1-6 | Run identification, usually initials of individual submitting job. | None | A6 |
| 8-13 | Name of analysis module to be processed. This entry is <i>mandatory</i> . Enter "BEACH." | None | A6 |
| 15-16 | Unit from which survey data will be read. Enter a "5" in position 16 if data are to be read from cards or card images. | 7 (magnetic media) | I2 |
| 77-80 | Enter "NOGO" to halt execution after printing of options and specifications, otherwise leave blank. | Run will be executed | A4 |

It is recommended that a printout of selected options and specifications, with further execution suppressed, be the first run for each analysis attempted. To do this, prepare the job and submit it with NOGO in positions 77 to 80 of the program identification card. The printed options (Fig. 3) and specifications (Fig. 4) should be carefully examined to be sure they match those requested. When satisfied that the desired options, specifications, and selected outputs are correct, resubmit the job with positions 77 to 80 blank.

2. The Header Record.

The header record (Table 1) follows the program identification card when data are read from cards or card images. If survey data are read in magnetic media format, the header record is not a part of the deck setup. See Section IV if more information concerning the header record is desired.

3. The Option Cards.

The option cards make it possible for the user to change some of the data characteristics, processing procedures, and output specifications assumed by the programs. Unless unit volume below datum is to be computed, none of the option cards are required. Table 5 contains the option cards used by BEACH and the values assigned when option cards are omitted. If any of the values are to be changed, only the option cards defining the value to be changed need be submitted and only the fields on the card pertaining to that value need be completed. A more detailed description of each option card follows.

a. Option Card 1--Input Horizontal Datum (Table 6). OPT CRD 1 defines the name of the lines surveyed (e.g., profile, range, transect) and the name of the input horizontal datum (e.g., bench mark, base line). If the card is omitted or the pertinent field left blank, the line will be labeled a PROFILE line and the input horizontal datum will be called the BENCH MARK.

b. Option Card 2--Display of Time (Table 7). The date of a survey always appears on outputs, but the time of the survey does not. OPT CRD 2 allows the user to define the type of time, if any, which is to appear on outputs. If the card is omitted or blank, only the date will appear. If the time of day

Table 5. BEACH analysis options and their defaults.

| Option card | Option | Default value |
|------------------------|---|--|
| OPT CRD 1 | Name of input horizontal datum | Bench mark |
| | Name of line surveyed | Profile |
| OPT CRD 2 | Format of time on outputs | No time appears |
| OPT CRD 3 | Abbreviation for new vertical datum and required vertical correction. | Abbreviation is as read from header record and no correction is made. |
| OPT CRD 4 | Output horizontal datum | Shoreline position during first survey of each profile line. |
| OPT CRD 5 | For unit volume above datum: reference for volume changes | Volume during first survey of each profile line. |
| | minimum acceptable starting distance (profiles beginning farther seaward are eliminated). | Input horizontal datum (e.g., bench mark). |
| OPT CRD 6 ¹ | For unit volume below datum: whether volume is to be computed and displayed. | Volume is not computed and displayed. |
| | If volume is computed: reference for volume changes | Volume during first survey of each profile line. |
| | seaward boundary for volume computations. | None |
| OPT CRD 7 | Description of the data, for use in titles. | As read from the header record |
| OPT CRD 8 | Linear units in which output is to appear. | As read from the header record |
| | Conversion factor to change input linear units to output linear units. | 1.0 |
| | Cubic units in which output is to appear. | If output units are anything but feet, UNIT ³ /UNIT; if output units are feet, YD ³ /FT. |
| | Conversion factor to convert squared output units to unit volume. | 1.0 if output units are not feet; 1/27 if output units are feet. |
| OPT CRD 9 | Whether or not the distance to the shoreline should be extrapolated, and the minimum elevation from which extrapolation is considered valid (>0). | No extrapolation is performed. |
| OPT CRD 10 | Format in which the final data file is to be read. | As necessary to read data as formatted in Table 3 if input is on cards, otherwise as in Table 2. |

¹If this card is omitted, unit volume below datum is not computed.

Table 6. Option card 1--input horizontal datum.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "1" | I1 |
| 11-17 | Enter the seven-character name of surveyed line if other than PROFILE. | A7 |
| 19-28 | Enter the 10-character name of input horizontal datum if other than BENCH MARK. | A10 |

Table 7. Option card 2--display of time.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "2" | I1 |
| 11 | Enter the code for the type of time to be written on printed outputs: 0 - no time is written 1 - 24-hour clock time 2 - decimal time | I1 |

NOTE.--Date of survey is always displayed on output.

(24-hour clock) or the time, hours, and hundredths option is selected, both date and time will be written on outputs. If the latter time option is selected, the minutes will be converted to hundredths of an hour and time displayed as a decimal number.

c. Option Card 3--Output Vertical Datum (Table 8). OPT CRD 3 allows the user to change the vertical datum to which the survey data are referenced. If the card is omitted or left blank, the vertical datum will be as defined on the header record and there will be no change to the vertical coordinates. If a change is desired, enter the four-character abbreviation of the new vertical datum and the amount, in selected *output units*, which must be *added* to each vertical coordinate to make the adjustment.

d. Option Card 4--Output Horizontal Datum (Table 9). OPT CRD 4 allows the user to select the reference horizontal datum to which the output is to be adjusted. If this card is omitted or left blank, the shoreline position during the first survey of each profile line is the output horizontal datum. The distance to the shoreline during the first survey at each profile is computed and this amount is *subtracted* from each distance coordinate. This may or may not be the same survey at all profile lines. Other choices for the output horizontal datum are: (1) the shoreline position during a survey other

Table 8. Option card 3--output vertical datum.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "3" | I1 |
| 11-14 | Enter the four-character abbreviation for output vertical datum if other than that on header record. | A4 |
| 15-25 | Enter the amount, in <i>output</i> units, to be <i>added</i> to each vertical coordinate. | F10.3 |

Table 9. Option card 4--output horizontal datum.

| Position No. | Entry description | FORTRAN format |
|------------------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "4" | I1 |
| 11-13 | Enter the number of profile lines. <i>Used only when the output horizontal datum is to be user-supplied.</i> If left blank, the number of profile lines will be as defined on the header record. ¹ The program will expect to read an adjustment for the number of lines entered here. | I3 |
| 15 (IXDTM) | Enter the type of output horizontal datum selected: 1 or blank - shoreline position during first or defined reference survey of each line 3 - mean shoreline position 4 - no adjustment to distance coordinates 5 - user-supplied. Adjustments entered on SUP 4A cards. | I1 |
| 16-19 (IXDTM = 1 only) | Enter the reference survey number. If blank, program uses the first survey of each line which may or may not be the same for all profile lines. All profile lines not surveyed during the selected reference are eliminated from processing. | I4 |
| 16-38 (IXDTM = 5 only) | Enter the first line of description of user-supplied horizontal datum. | 2A10,A3 |
| 39-67 (IXDTM = 5 only) | Enter the second line of description of user-supplied horizontal datum. | 2A10,A9 |

¹The header record contains the largest and smallest profile line number. If there is not a profile line associated with each number between, this field should not be left blank.

than the first, (2) the mean shoreline position, (3) the input horizontal datum (i.e., bench mark--in this case the distance coordinates are unaltered), and (4) a user-supplied correction. If shoreline on reference survey, mean shoreline, or bench mark is chosen, use OPT CRD 4, format 1, shown in the Appendix; if the correction is user-supplied, use OPT CRD 4, format 2.

If the correction is supplied, the user must provide SUP 4A (Table 10) cards to define the amount, in output units, which is to be subtracted from each distance coordinate at each profile line. The SUP 4A cards must immediately follow OPT CRD 4, be sequentially numbered, and cannot be included if the output horizontal datum adjustment is not user-supplied. While there need not be an entry on the SUP 4A cards for every profile line in the data set, only those represented will be processed by BEACH.

Table 10. Supplementary option cards 4A--distance to output horizontal datum, user-supplied.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "SUP" | A3 |
| 5-6 | "4A" | A2 |
| 7-9 | Sequential card number | I3 |
| 11-13 | Profile line number | I3 |
| 14-23 | Corresponding adjustment in <i>output</i> units, to be <i>subtracted</i> from each distance coordinate. | F10.3 |
| 24-26 | Profile line number | I3 |
| 27-36 | Corresponding adjustment | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Corresponding adjustment | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Corresponding adjustment | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Corresponding adjustment | F10.3 |

The output horizontal datum option has proven to be useful for plotting profiles with horizontal datums well inland of the active beach, or for comparing lines with datums at varying distances from the shoreline. By adjusting the horizontal datum, profiles are effectively "lined up" at the shoreline, dune crest, or other selected reference distance. Care must be taken to ensure that the horizontal datum exists on the reference survey of each profile line. For example, under default conditions, the reference survey is the first survey of each profile line and the horizontal datum is the distance to the zero elevation at the time of that survey. If this position is not defined (i.e., the survey did not extend far enough seaward), the profile line is eliminated from the data set and any output from that particular line is suppressed.

Care must also be taken to ensure that subsequent runs of the data file have the same reference. When data are extracted from larger sets or new data are added to existing sets, it is possible that the first survey of a line will change; it is certain that the mean shoreline position will change. Under these circumstances, the user should record the distance to the horizontal datum for the original data set and supply it on SUP 4A card during subsequent runs.

e. Option Card 5--Zero Unit Volume (Table 11). OPT CRD 5 enables the user to select the zero unit volume for unit volume changes above datum. Zero unit volume will be subtracted from unit volumes to compute changes from the reference. Also on this card is the minimum distance, in output units, from the input horizontal datum that a profile must begin to be considered for unit volume computations. Since the landward boundary for unit volume computation is the landwardmost point all surveys of a profile line have in common, some unusually short surveys may force a landward boundary that is too far seaward. These surveys will not be considered if they begin farther seaward than the specified tolerance. This tolerance should be carefully chosen since it may cause too many surveys to be eliminated. The maximum and minimum tables produced by the EDIT2 program (see Vol. II) are quite useful in selecting an appropriate tolerance. Unit volume above datum will not be computed at profiles which begin farther seaward than the selected tolerance or which do not extend to the output vertical datum.

If the card is omitted or left blank, the zero unit volume will be the volume computed during the first survey of each profile line and only surveys beginning at or landward of the input horizontal datum will be considered for volume computations.

Other options which may be selected for zero unit volume are: (1) unit volume during a reference survey other than the first, (2) the mean unit volume at each profile line, or (3) a user-supplied unit volume. Use OPT CRD 5, format 1, in the Appendix if unit volume during a reference survey or mean unit volume is chosen as the zero; use OPT CRD 5, format 2, if the zero volume is user-supplied.

If the zero unit volume is user-supplied, supplementary option cards SUP 5A (Table 12) must be included immediately following OPT CRD 5. There should be as many of these cards as required to supply a zero volume for the number of profile lines read from OPT CRD 5. All profile lines need not be represented; those not represented will be eliminated from all BEACH outputs.

Also required, when the zero volume is user-supplied, immediately following SUP 5A cards, are SUP 5B (Table 13) cards. These cards provide the landward boundary used for volume computations at each profile line represented on the SUP 5A cards. All profiles beginning farther seaward than the defined landward boundary are eliminated from processing.

SUP 5A and SUP 5B cards are included only when the zero volume is user-supplied.

All BEACH outputs require that a reference for computing change in unit volume be supplied. The reference should be carefully selected; if unit volume cannot be computed during the reference survey (profile begins too far seaward or does not extend to output vertical datum) all data collected at the profile line will be eliminated from the data set and there will be no output

Table 11. Option card 5--zero unit volume above datum.

| Position No. | Entry description | FORTTRAN format |
|-----------------------------|---|-----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "5" | I1 |
| 11-13 (IVOL = 5 only) | Enter the number of profile lines. The module will expect to read a zero volume and a landward boundary for the number of lines entered here. | I3 |
| 15 (IVOL) | Enter the type of reference for unit volume changes: 1 or blank - unit volume during first or defined reference survey 3 - mean unit volume 5 - user-supplied; zero volumes and associated landward boundaries entered on SUP 5A and SUP 5B cards. | I1 |
| 16-19 (IVOL = 1 only) | Enter the reference survey number for volume changes. If this field is blank, the volume computed during the first survey of each profile line will be used. | I4 |
| 16-38 (IVOL = 5 only) | Enter the first line of description of user-supplied zero volume. | 2A10,A3 |
| 39-67 (IVOL = 5 only) | Enter the second line of description of user-supplied zero volume. | 2A10,A9 |
| 71-80 (IVOL = 1 and 3 only) | Enter minimum acceptable starting distance from the input horizontal datum in output units. Profiles beginning farther seaward are eliminated. | F10.3 |

Table 12. Supplementary option cards 5A--zero unit volume above datum, user-supplied.

| Position No. | Entry description | FORTTRAN format |
|--------------|---|-----------------|
| 1-3 | "SUP" | A3 |
| 5-6 | "5A" | A2 |
| 7-9 | Sequential card number | I3 |
| 11-13 | Profile line number | I3 |
| 14-23 | Associated zero unit volume in cubic output units | F10.3 |
| 24-26 | Profile line number | I3 |
| 27-36 | Zero unit volume | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Zero unit volume | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Zero unit volume | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Zero unit volume | F10.3 |

Table 13. Supplementary option cards 5B--landward boundary for user-supplied zero volumes.

| Position No. | Entry description | FORTTRAN format |
|--------------|---|-----------------|
| 1-3 | "SUP" | A3 |
| 5-6 | "5B" | A2 |
| 7-9 | Sequential card number | I3 |
| 11-13 | Profile line number | I3 |
| 14-23 | Associated landward boundary in output units from output horizontal datum | F10.3 |
| 24-26 | Profile line number | I3 |
| 27-36 | Landward boundary | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Landward boundary | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Landward boundary | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Landward boundary | F10.3 |

NOTE:--There must be an entry on these cards for each entry on the SUP 5A cards.

for that line. Also remember that changing the data set may cause the reference volume to change (e.g., first survey or mean unit volume may change). Under these conditions, the user should supply the reference unit volume on subsequent runs.

f. Option Card 6--Zero Unit Volume Below Datum (Table 14). The information supplied on OPT CRD 6 corresponds to the information provided on OPT CRD 5 with the following exceptions:

(1) If the card is omitted, unit volume below datum will not be computed. PLOT8 and PLOT9 cannot be produced.

(2) The seaward boundary, from output horizontal datum, rather than the minimum profile starting distance is supplied. There is no default for this value.

(3) The supplementary option cards SUP 6B contain seaward rather than landward boundaries.

Again, the supplementary option cards SUP 6A (Table 15) and SUP 6B (Table 16) are included only if the zero unit volumes are user-supplied. The failure to identify a profile line on these cards, while it will inhibit the computation of unit volume below datum at the profile line, has no effect on the computation of unit volume above datum or shoreline computations.

Unit volume below datum is not computed for profiles which either end landward of the selected seaward boundary or for which unit volume above datum cannot be computed. If unit volume below datum cannot be computed for the reference survey, there will be no unit volume below datum computations for the profile line. This has no effect on unit volume above datum or shoreline position computations. Subparagraphs d and e of this paragraph provide guidelines and cautions in selecting the reference. If the reference unit volume is not user-supplied, use OPT CRD 6, format 1, in the Appendix. If the zero unit volume is user-supplied, use OPT CRD 6, format 2.

g. Option Card 7--Data Description (Table 17). The description of the data (e.g., locality or site name) contained on the header record will appear on each output. If the user wishes to change this description, OPT CRD 7 may be used. If the card is omitted or left blank, the data description will be as defined on the header record.

h. Option Card 8--Linear Output Units (Table 18). OPT CRD 8 is used to define the linear output units. If the card is omitted or left blank, the linear output units will be the same as the input. If output units are to be meters or centimeters and the input is in feet, the conversion factor is supplied by the program; otherwise, the user must supply the required conversion factor. Each distance and elevation read from the input survey file will be multiplied by this factor.

Once linear output units are determined, cubic output units will be expressed as follows:

Table 14. Option card 6--zero unit volume below datum.

| Position No. | Entry description | FORTRAN format |
|-----------------------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "6" | I1 |
| 11-13 (IVOL = 5 only) | Enter the number of profile lines used only when the reference unit volume is user-supplied. The program will expect to read a zero volume and a seaward boundary for the number of lines entered here. | I3 |
| 15 (IVOL) | Enter the type of reference for unit volume changes: blank - no unit volume below datum will be computed 1 - unit volume during first or defined reference survey 3 - mean unit volume 5 - user-supplied; zero volumes and associated seaward boundaries entered on SUP 6A and SUP 6B cards. | I1 |
| 16-19 (IVOL = 1 only) | Enter the reference survey number for zero volume if blank program uses first survey of each profile line, which may or may not be the same for all lines. Enter a survey number if a survey other than the first should be used. | I4 |
| 16-38 (IVOL = 5 only) | Enter the first line of description of user-supplied zero volume. | 2A10,A3 |
| 39-67 (IVOL = 5 only) | Enter the second line of description of user-supplied zero volume. | 2A10,A9 |
| 71-80 (IVOL = 1 and 3 only) | Enter seaward boundary in output units from output horizontal datum. Profiles ending farther landward will have no unit volume below datum computed. | F10.3 |

Table 15. Supplementary option cards 6A--zero unit volume below datum, user-supplied.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "SUP" | A3 |
| 5-6 | "6A" | A2 |
| 7-9 | Sequential card number | I3 |
| 11-13 | Profile line number | I3 |
| 14-23 | Associated zero unit volume in cubic output units | F10.3 |
| 24-26 | Profile line number | I3 |
| 27-36 | Zero unit volume | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Zero unit volume | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Zero unit volume | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Zero unit volume | F10.3 |

Table 16. Supplementary option cards 6B--seaward boundary for user-supplied zero volumes.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "SUP" | A3 |
| 5-6 | "6B" | A2 |
| 7-9 | Sequential card number | I3 |
| 11-13 | Profile line number | I3 |
| 14-23 | Associated seaward boundary in output units from input horizontal datum | F10.3 |
| 24-26 | Profile line number | I3 |
| 27-36 | Seaward boundary | F10.3 |
| 37-39 | Profile line number | I3 |
| 40-49 | Seaward boundary | F10.3 |
| 50-52 | Profile line number | I3 |
| 53-62 | Seaward boundary | F10.3 |
| 63-65 | Profile line number | I3 |
| 66-75 | Seaward boundary | F10.3 |

NOTE:--There must be an entry on these cards for each entry on the SUP 6A cards.

Table 17. Option card 7--data description.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "7" | I1 |
| 11-41 | Enter the 31-character data description which supersedes the description on the header record. | 3A10,A1 |

Table 18. Option card 8--linear and cubic output units.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-9 | "CRD" | A3 |
| 9 | "8" | I1 |
| 11-12 | Enter the abbreviation for linear output units of measurement. If blank, these will be as defined on the header record. | A2 |
| 13-22 | Enter the conversion factor. Input units are multiplied by this number to convert to output units. This field may be blank if (a) Input and output units are the same (factor set to 1). (b) Input units are FT, output units are M (factor set to 0.3048). (c) Input units are FT, output units are CM (factor set to 30.48). | F10.3 |
| 24-25 | Enter the abbreviation for cubic part ¹ of unit volume. If blank, and (a) Linear output units are FT, this will be YD. (b) Linear output units are not feet, this will be the same as linear output units. | A2 |
| 27-28 | Enter the abbreviation for linear part ¹ of unit volume. If blank, this will be the same as linear output units. | A2 |
| 30-39 | Enter the factor to convert squared output units to cubic output units. If blank, and (a) Linear output units are feet, this will be 1/27. (b) Linear output units are not feet, this will be 1.0. | F10.3 |

¹In the expression YD^3/FT , YD is the cubic part, FT is the linear part.

(1) Units cubed per unit unless output units are feet.

(2) Cubic yards per foot if output units are feet.

If this is not acceptable, an appropriate description and factor to convert squared output units to cubic units may be entered on OPT CRD 8.

i. Option Card 9--Extrapolation to Zero Elevation (Table 19). Since the shoreline position is of major interest in the analysis of beach profile data, there may be cases when the user decides that extrapolating the distance to the zero elevation is valid. In this case, OPT CRD 9 can be used to specify the elevation, in output units relative to the output vertical datum, that the last surveyed point must reach before the shoreline position can be extrapolated. If the card is omitted or left blank, no extrapolation occurs. When any computation is performed using data for which the shoreline position was extrapolated, output of the results of that computation is flagged. No extrapolation will be performed for profiles where the last line segment is not sloping seaward.

Table 19. Option card 9--extrapolation to zero elevation.

| Position No. | Entry description | FORTRAN format |
|--------------|---|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 9 | "9" | I1 |
| 11-20 | Enter the maximum elevation above the output vertical datum, in output units, which the last surveyed point must reach in order that the shoreline position (datum intercept) be extrapolated. If this is blank or zero, the shoreline position will not be extrapolated. | F10.3 |

j. Option Card 10--Format of Input Data (Table 20). If the format specified for card image data (Table 3) or magnetic media data (Table 2) does not fit the format of the user's input data, an alternate format may be specified using OPT CRD 10. Knowledge of FORTRAN format specifications is required to use this option effectively. All the data elements but the locality code are used in the analysis computations. Thus, while this card can be used to change the field length, order, or format in which data elements are read, all elements must be present. The expected order of the variables is shown in Tables 2 and 3; the order in which the variables are read may be changed by using the FORTRAN tab or T format specification. The T format specification is described in most FORTRAN texts and reference manuals, e.g., Stuart (1970)¹.

¹Stuart, F., *FORTRAN Programming*, John Wiley & Sons, Inc., 1970.

Table 20. Option card 10--format of input data.

| Position No. | Entry description | FORTRAN format |
|--------------|--|----------------|
| 1-3 | "OPT" | A3 |
| 5-7 | "CRD" | A3 |
| 8-9 | "10" | I2 |
| 11-80 | Enter the survey data format. If this card is blank or omitted, data will read as follows: (a) Input unit is 5 (2X,I3,I4,1X,3I2, I3,I2,F5.0,11X,8F5.0/(10X,I3F5.0)). (b) Input unit is 7 (2X,I3,I4,3I2,I3, I2,I3,F5.0,7X,I20F5.0). | 7A10 |

4. Processing Specification Cards.

These cards are used to define special physical characteristics or processing requirements of the data. When they are omitted, the program assumes that the data conform to certain specifications and assigns default values based on these assumptions. The only processing specification card used by BEACH is the VOLUME specification card (Table 21); it is used to define upper and lower contour boundaries for volume computations. If the card is not included, the lower contour for volume computations will be -100 units and the upper contour will be the profile surface. When processing specification cards used for other analysis modules are included in the BEACH setup, they are ignored and there is no effect on processing.

Table 21. Format of VOLUME specification card.

| Position No. | Entry description | FORTRAN format | Default value |
|--------------|--|----------------|-----------------|
| 1-6 | "VOLUME" | A6 | None |
| 11-20 | Lower boundary, in output units relative to output vertical datum. Must be ≤ 0 . | F10.3 | -100 |
| 21-30 | Upper boundary, in output units relative to output vertical datum. Must be more than lower boundary. | F10.3 | Profile surface |

5. Output Specification Cards.

BEACH will produce two tabular and four graphical displays: TABLE8, TABLE8A, PLOT7, PLOT8, PLOT9, and PLOT10. These outputs are described in detail in Section V. Any or all of the outputs may be produced during a single run. An output and any required specifications for the output are selected by entering an output specification card. One, and only one, card must be entered for each output selected.

a. Table Output. TABLE8 (Fig. 5) and TABLE8A (Fig. 6) are selected on the same output specification card (Table 22). Information on this card determines whether TABLE8, TABLE8A, or both are to be output and the type of time (hours, days, months, or years) to be used in the regression analysis.

Table 22. Format of TABLE specification card.

| Position No. | Entry description | FORTRAN format | Default value |
|-----------------|--|----------------|------------------------------|
| 1-5 | "TABLE" | A5 | None |
| 9 | "8" | I1 | None |
| 10 | Enter an "A" if TABLE8A output is desired. | A1 | TABLE8A is not output |
| 12-15 | Enter "ONLY" if only TABLE8A output is desired. | A4 | TABLE8 is output. |
| 27 ¹ | Enter type of time for regression analysis and time between surveys: "H" - hours "D" - days "M" - months "Y" - years | A1 | Time is expressed as months. |

¹This entry must match the type of time selected for PLOT7 and PLOT8 outputs.

b. Plot Output. Table 23 describes the format for the output specification cards for plot output (Figs. 7 to 10) and defines the defaults which will be assigned if positions 13 to 80 are not completed. A separate card must be prepared for each type of plot to be output. With the exception of the plot output unit, it is not necessary that each type of plot have the same specifications when more than one type is output during a single run; format specifications for each type of plot are read and processed separately.

(1) Output Unit for Plot Commands. The plot commands may be written either to unit 3 (normally signaling card output) or 8 (normally signaling output to magnetic tape). The user must ensure that data written to these units are handled properly in the job control stream. All plot commands will be written to the unit defined on the last plot output specification card encountered.

(2) Default Plot Specification. If the defaults for values supplied in positions 13 to 80 are acceptable and the selected output units of measurement are feet, positions 13 to 80 need not be completed. However, if any plot specifications are to be supplied or output units are not feet, all fields must be completed. (The unit onto which plot commands are to be written may be changed without affecting other default specifications.)

(3) Horizontal Axis (Time, PLOT7 and PLOT8 Only). There are four ways in which time may be represented on the horizontal axis: hours, days, months,

Table 23. Format of PLOT specification card.

| Position No. | Entry description | FORTTRAN format | Default value | PLOT7 | Used by PLOT8 | PLOT9 | PLOT10 |
|-----------------|---|-----------------|--|-------|---------------|-------|--------|
| 1-4 | "PLOT" | A4 | None | Yes | Yes | Yes | Yes |
| 8-9 | Plot number (7, 8, 9, 10) | I2 | None | Yes | Yes | Yes | Yes |
| 11 ¹ | Output unit for plot: blank or "3" - cards "8" - magnetic tape | I1 | 3 | Yes | Yes | Yes | Yes |
| 12 | Use default specifications? "0" - yes (cannot be used if output units are not feet) "1" - no Horizontal axis: PLOT7 and PLOT8, time ² PLOT9, change in volume below datum PLOT10, change in shoreline | I1 | 3 | Yes | Yes | Yes | Yes |
| 13-20 | origin | F8.2 | 0 (PLOT7, PLOT8) -30 (PLOT9) -150 (PLOT10) | Yes | Yes | Yes | Yes |
| 21-27 | increment (units per inch on plot) | F7.2 | 2 (PLOT7, PLOT8) 10 (PLOT9) 50 (PLOT10) | Yes | Yes | Yes | Yes |
| 28-31 | length in inches Vertical axis: PLOT7, PLOT9, and PLOT10, unit volume above datum PLOT8, unit volume below datum | F4.1 | 6 | Yes | Yes | Yes | Yes |
| 33-40 | origin | F8.2 | -25 | Yes | Yes | Yes | Yes |
| 41-47 | increment (units per inch on plot) | F7.2 | 10 | Yes | Yes | Yes | Yes |
| 48-51 | length in inches | F4.1 | 5 | Yes | Yes | Yes | Yes |
| 53-54 | Number profile lines on each plot | I2 | 10 | No | No | Yes | Yes |
| 62-67 | Overlap: "OVLAP" - plots overlapped blank - no overlap | A6 | No overlap | No | No | Yes | Yes |
| 69 | Factoring: "0" - size of plot not altered "1" - size of plot altered | I1 | No factoring | Yes | Yes | Yes | Yes |
| 71 | Type of time ³ | A1 | Time in months | Yes | Yes | No | No |

¹Must be the same for all plot outputs.

²If type of time is months, the user has no control over horizontal axis origin, increment, or length; and positions 13 to 31 may be blank. If time is years, the year should be expressed as 19XX.

³This selection must agree on TABLE 8A, PLOT7, and PLOT8.

or years (Fig. 13). When time is represented in months, the user has no control over the origin, length, or increment on the horizontal axis. Positions 26 to 42 may be left blank. Type of time (hours, days, months, or years) must agree on PLOT7, PLOT8, TABLE8, and TABLE8A specification cards. If it does not, the type of time used will be that read from the last specification card encountered.

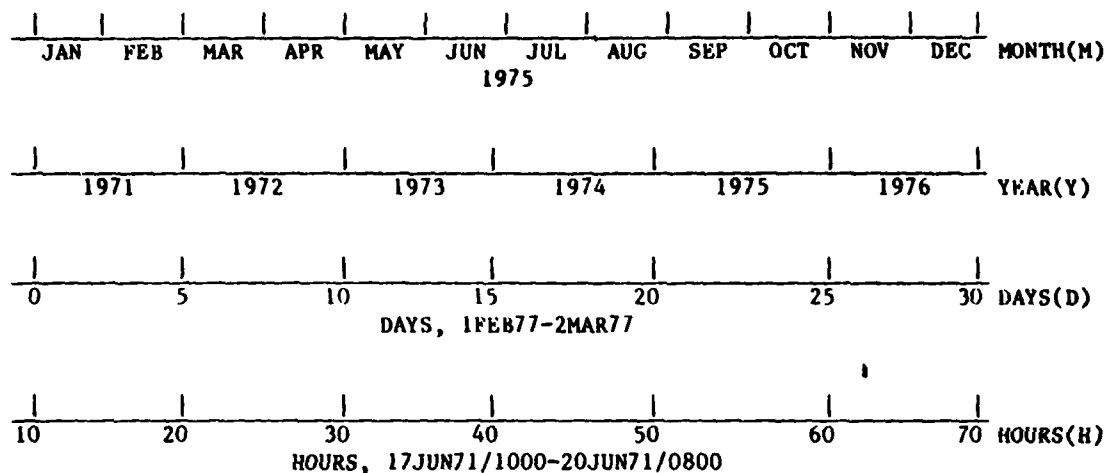


Figure 13. Types of time-elapsed axis available.

(4) Lines Per Plot. While data for only one profile line can be depicted on each PLOT7 and PLOT8 output, data for up to 10 profiles may be displayed on each PLOT9 and PLOT10 output. The number of lines per plot appears in the plot title describing how many profile lines are represented on the plot. It is possible, therefore, for the last plot to contain data for less profile lines than indicated in the title.

(5) Overlap (PLOT9 and PLOT10 Only). When the number of profiles drawn on a single plot (lines per plot) is greater than 1, the user may specify that plots be overlapped. The last profile line drawn on each plot will be the first drawn on the next until all data have been plotted. The overlapped data counts toward the number of lines per plot.

(6) Factoring. The factoring option is used to specify whether or not the final plot size is to be altered before being output. The user has no control over the factor used; this is determined by the length of the longer axis. When plots are factored, the x-axis will be no longer than 10 inches and the y-axis no longer than 6 inches. Plot size will be increased if both axes are shorter and decreased if either is longer.

(7) Defining Axis Length, Increment, and Origin. The TABLE8 output from the module can be used to determine the best axis specifications. PLOT9 and PLOT10 will not plot data which fall outside the parameter defined by the axis. These two plots depict a great deal of data on a single axis and if a

sufficient increment is not allowed, the information may be difficult to interpret. PLOT7 and PLOT8 will draw data for no more than a single profile line per plot. All data are plotted no matter where they fall. Allow an extra inch on both the horizontal and vertical axes so that the plot legend will not interfere with the plotted data. When a large number of plots are to be produced, some test plots should be run and examined before the final production run is submitted.

VII. SUMMARY

BEACH produces two table and four graphical displays. Its major functions are to display and relate unit volume and shoreline position changes. As with other analysis programs in the BPAS, outputs have been designed so that they can be used in reports without being redrafted.

APPENDIX

BEACH RECORD LAYOUTS FOR OPTION, PROCESSING,
AND OUTPUT SPECIFICATION CARDS

Program Identification Card for All Analysis Modules

| (AL) | | | | | | | | | | (ALG) | | | | | | | | | | (IL) | | | | | | | | | | (A4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|---|---|---|---|---|---|---|---|----|-------------|----|----|----|----|----|----|----|----|----|------------|----|----|----|----|----|----|----|----|----|--------------------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Run Name | | | | | | | | | | Module Name | | | | | | | | | | Input Unit | | | | | | | | | | Enter "NOGO" to Stop Execution | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |

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(A10)

| DATE | OF | SUCCESS |
|------|----|---------|
| 1990 | 10 | 10 |
| 1991 | 10 | 10 |
| 1992 | 10 | 10 |
| 1993 | 10 | 10 |
| 1994 | 10 | 10 |
| 1995 | 10 | 10 |
| 1996 | 10 | 10 |
| 1997 | 10 | 10 |
| 1998 | 10 | 10 |
| 1999 | 10 | 10 |
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| 2001 | 10 | 10 |
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| 2096 | 10 | 10 |
| 2097 | 10 | 10 |
| 2098 | 10 | 10 |
| 2099 | 10 | 10 |
| 2100 | 10 | 10 |
| 2101 | 10 | 10 |
| 2102 | 10 | 10 |
| 2103 | 10 | 10 |
| 2104 | 10 | 10 |
| 2105 | 10 | 10 |
| 2106 | 10 | 10 |
| 2107 | 10 | 10 |
| 2108 | 10 | 10 |
| 2109 | 10 | 10 |
| 2110 | 10 | 10 |
| 2111 | 10 | 10 |
| 2112 | 10 | 10</ |

Option Card 2 for All Analysis Modules
(display of time)

(II)

Time on output:

0 → NO
1 → 24 hour clock
2 → Hours and hundredths

OPT CRD 2

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|

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SHEET OF SHEETS

Option Card 3 for All Analysis Modules
(output vertical datum)

| | | (A14) (E16.3) | |
|----|----|-------------------------------|---|
| | | Name of Output Vertical Datum | Amount (output units) to add to vertical coordinates to convert |
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | 32 |
| 33 | 34 | 35 | 36 |
| 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 |
| 45 | 46 | 47 | 48 |
| 49 | 50 | 51 | 52 |
| 53 | 54 | 55 | 56 |
| 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 |
| 65 | 66 | 67 | 68 |
| 69 | 70 | 71 | 72 |
| 73 | 74 | 75 | 76 |
| 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 |
| 85 | 86 | 87 | 88 |
| 89 | 90 | 91 | 92 |
| 93 | 94 | 95 | 96 |
| 97 | 98 | 99 | 100 |

OPT CARD 3

ENG 2500 80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET SHEET OF SHEETS

Option Card 4, Format 1, for All Analysis Modules

| Use this format when horizontal datum is not user-supplied | | | | | | | | | | Horizontal Datum: 1 → Reference survey 3 → Mean shoreline 4 → Benchmark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| CPI CARD 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

ENG FORM 2900 1-6-66 (Rev. 1-6-66) 80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET

Option Card 4, Format 2, for All Analysis Modules

| (E3) | | (2A10.A3) | | | | | | | | | | (2A10.A9) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|-------------------------|---|---|---|---|---|---|----|----|----|-----------|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Use this format when horizontal datum is user supplied | | Number of profile lines | | First line of description of horizontal datum | | | | | | | | | | Second line of description of horizontal datum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| CPT CRD 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div>80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET</div> <div> <div>ENG</div> <div>FORM</div> <div>2000</div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>8</div> <div>9</div> <div>10</div> <div>11</div> <div>12</div> <div>13</div> <div>14</div> <div>15</div> <div>16</div> <div>17</div> <div>18</div> <div>19</div> <div>20</div> <div>21</div> <div>22</div> <div>23</div> <div>24</div> <div>25</div> <div>26</div> <div>27</div> <div>28</div> <div>29</div> <div>30</div> <div>31</div> <div>32</div> <div>33</div> <div>34</div> <div>35</div> <div>36</div> <div>37</div> <div>38</div> <div>39</div> <div>40</div> <div>41</div> <div>42</div> <div>43</div> <div>44</div> <div>45</div> <div>46</div> <div>47</div> <div>48</div> <div>49</div> <div>50</div> <div>51</div> <div>52</div> <div>53</div> <div>54</div> <div>55</div> <div>56</div> <div>57</div> <div>58</div> <div>59</div> <div>60</div> <div>61</div> <div>62</div> <div>63</div> <div>64</div> <div>65</div> <div>66</div> <div>67</div> <div>68</div> <div>69</div> <div>70</div> <div>71</div> <div>72</div> <div>73</div> <div>74</div> <div>75</div> <div>76</div> <div>77</div> <div>78</div> <div>79</div> <div>80</div> </div> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

**Supplementary Option Card 4A for All Analysis Modules
(use only in conjunction with OPT CRD 4, Format 2)**

[illegible]

Option Card 5, Format 1, for All Analysis Modules

| Use this for mat when zero volume is not user- supplied | | | | | | | | | | (11) (14) Refer- ence survey number (if not first) type 1 only | | | | | | | | | | Zero volume (above datum): 1 → Reference survey 3 → Mean unit volume | | | | | | | | | | (FID.3) minimum acceptable starting distance (output units from datum horizontal datum) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|--|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| OPT CARD 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

ENG FORM 2900 1-64 (Rev. 1-64) 80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET SHEET OF SHEETS

Option Card 5, Format 2

| (I3) | | | | | | | | | | | | | (2A16,A3) | | | | | | | | | | | | | (2A10,A4) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|-------------------------|---|---|---|----|---|----|----|-----------|----|----|----|----|----|----|----|----|----|--|----|----|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Use this format when zero volume is user supplied | | | | | Number of profile lines | | | | | First line of description of zero unit volume above datum | | | | | | | | | | | | | Second line of description of zero unit volume above datum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 011 010 5 | | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Supplementary Option Card 5A

(use only in conjunction with OPT CRD 5, Format 2 and SUP 5B cards)

SHEETS

Supplementary Option Card 5B
(use only in conjunction with OPT CRD 5, Format 2 and SUP 5A cards)

| (I3) | | (I3) | | (F10.3) | | (I3) | | (F10.3) | | (I3) | | (F10.3) | | (I3) | | (F10.3) | |
|---|-------------|----------------|---|----------------|---------------------------------|----------------|---------------------------------|----------------|---------------------------------|----------------|---------------------------------|----------------|---------------------------------|----------------|---------------------------------|----------------|---------------------------------|
| Use only if type on OPT CRD 5 is 5 | Seq. Number | Profile Number | Corresponding landward boundary (output units from output horizontal datum) | Profile Number | Corresponding landward boundary | Profile Number | Corresponding landward boundary | Profile Number | Corresponding landward boundary | Profile Number | Corresponding landward boundary | Profile Number | Corresponding landward boundary | Profile Number | Corresponding landward boundary | Profile Number | Corresponding landward boundary |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| SUP 5B | | | | | | | | | | | | | | | | | |
| <div style="display: flex; justify-content: space-between;"> 192021222324252627282930313233343536 </div> <div style="display: flex; justify-content: space-between;"> 373839404142434445464748495051525354 </div> <div style="display: flex; justify-content: space-between;"> 555657585960616263646566676869707172 </div> <div style="display: flex; justify-content: space-between;"> 737475767778798081828384858687888990 </div> | | | | | | | | | | | | | | | | | |

Option Card 6, Format 1

| (I) (T4) | | (F10.3) |
|---|---|---|
| Use this format when zero unit volume is not user- supplied | Reference number (if not first) when type is only | Seward boundary, output units from output horizontal datum |
| OPT CAN 6 | | |

Option Card 6, Format 2
(must be followed by SUP 6A and SUP 6B cards)

| Use this format when zero volume is user-supplied | | | | | | | | | | (I3) | | | | | | | | | | (2A10,A3) | | | | | | | | | | (2A10,A9) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|-------------------------|----|----|----|----|----|----|----|----|----|---|----|----|----|----|----|----|----|----|----|--|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | | | | | | | | Number of profile lines | | | | | | | | | | First line of description of zero unit volume below datum | | | | | | | | | | Second line of description of zero unit volume below datum | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| OPT CARD 6 | | | | | | | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Form 2900 (and reproduction of the form is authorized after device information is filled in.) 80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET SHEET OF SHEETS

Supplementary Option Card 6B
(use only in conjunction with OPT CRD 6, Format 2 and SUP 6A cards)

| (I3) | | (I3) | (F10.3) | (I3) | (F10.3) | (I3) | (F10.3) | (I3) | (F10.3) | (I3) | (F10.3) | (I3) | (F10.3) |
|------------------------------------|-------------|---------------------|--|----------------|--------------------------------|----------------|--------------------------------|----------------|--------------------------------|----------------|--------------------------------|----------------|--------------------------------|
| Use only if type on OPT CRD 6 is 5 | Seq. Number | Profile Line Number | Corresponding seaward boundary output units from output horizontal datum | Profile Number | Corresponding seaward boundary | Profile Number | Corresponding seaward boundary | Profile Number | Corresponding seaward boundary | Profile Number | Corresponding seaward boundary | Profile Number | Corresponding seaward boundary |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 |
| 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 |
| 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 |
| 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 |
| 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 |
| 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 |
| 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 |
| 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 |
| 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 |
| 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 |
| 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 |
| 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 |
| 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 |
| 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 |
| 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 |
| 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 |
| 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 |
| 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 |
| 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 |
| 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 |
| 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 |
| 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 |
| 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 |
| 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 |
| 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 |
| 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 |
| 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 |
| 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 |
| 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 |
| 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 |
| 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 |
| 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 |
| 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 |
| 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 |
| 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 |
| 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 |
| 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 |
| 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 |
| 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 |
| 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 |
| 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 |
| 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 |
| 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 |
| 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 |
| 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 |
| 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 |
| 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 |
| 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 |
| 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 |
| 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 |
| 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 |
| 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 |
| 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 |
| 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 |
| 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 |
| 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 |
| 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 |
| 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 |
| 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 |
| 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 |
| 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 |
| 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 |
| 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 |
| 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 |
| 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 |
| 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 |
| 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 |
| 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 |
| 1023 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 |
| 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 |
| 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 |
| 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 |
| 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 |
| 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 | 1105 | 1106 |
| 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 | 1120 |
| 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 |
| 1135 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 |
| 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 |
| 1163 | 1164 | 1165 | 1166 | 1167 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 |
| 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 |
| 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 | 1201 | 1202 | 1203 | 1204 |
| 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 |
| 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 | 1232 |
| 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 |
| 1247 | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 |
| 1261 | 1262 | 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 |
| 1275 | 1276 | 1277 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 |
| 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 |
| 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 |
| 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 | 1329 | 1330 |
| 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 |
| 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 |
| 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 13 | | | | | |

(3A10, A1)

31 character description of data if that on the header record is not acceptable

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| OPT CARD 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | OPT CARD 7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Option Card 8
(linear and cubic output units)

| | | (A1) (F.D.3) | (A2) | (A3) | (F.D.3) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | Factor to convert input to output. Not required if: linear output FT - CM or if no conversion is required. | Cubic portion of cubic output units to linear output. | Linear portion of cubic output units to linear output. | Factor to convert squared output units to cubic output units. Not required if no conversion is needed or if changing F12 to YD/FT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | |
| OPT CARD 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

ENG 2500 (Local reproduction of this form is authorized after desired information is filed-in.) 80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET SHEET OF SHEETS

Option Card 9
(extrapolation to output vertical datum)

(F10.3)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | Minimum elevation, output units from output vertical datum, of last surveyed point from which shore line can be extrapolated | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | |
| OPT CARD 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

SHEET OF SHEETS

80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET

FORM 2900 (Rev. 1-64) (This form is authorized for use by the Department of the Interior.)

ENG 11-11-64

(7A10)

Format of input survey data if other than one of the two described earlier.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

VOLUME Specification Card

| | | | | | | | | | | (F10.3) Lower elevation for volume below computations. Must be ≤ 0 . If blank - no units is used. | | | | | | | | | | (F10.3) Upper elevation for volume above computations. Must be ≥ 0 . If blank, Profile surface is used. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| VOLUME | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

800 FORM 2900 (Last reproduction of this form is authorized after desired information is added.) 80 COLUMN KEY PUNCH TRANSCRIPT LAYOUT SHEET

TABLE 8 and TABLE 8A Output Specification Card

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | (A1) | | | | | | | | | | (A4) | | | | | | | | | | (R1) | | | | | | | | | | * Kind of time "H" → hours "D" → days "M" → months "Y" → years must agree with entry in cc 71 of PLOT 7 and PLOT 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Enter H, D, M, Y | | | | | | | | | | * ONLY: Do not produce TABLE 8 (for any cc 10 must be "H") | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TABLE 8 | | | | | | | | | | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |

PLOT7, PLOT8, PLOT9, and PLOT10 Specification Cards

| (3000) | | | | | | | | | | | | (541) | | | | | | | | | | | | (542) | | | | | | | | | | | | (543) | | | | | | | | | | | | (544) | | | | | | | | | | | | (545) | | | | | | | | | | | | (546) | | | | | | | | | | | | (547) | | | | | | | | | | | | (548) | | | | | | | | | | | | (549) | | | | | | | | | | | | (550) | | | | | | | | | | | | (551) | | | | | | | | | | | | (552) | | | | | | | | | | | | (553) | | | | | | | | | | | | (554) | | | | | | | | | | | | (555) | | | | | | | | | | | | (556) | | | | | | | | | | | | (557) | | | | | | | | | | | | (558) | | | | | | | | | | | | (559) | | | | | | | | | | | | (560) | | | | | | | | | | | | (561) | | | | | | | | | | | | (562) | | | | | | | | | | | | (563) | | | | | | | | | | | | (564) | | | | | | | | | | | | (565) | | | | | | | | | | | | (566) | | | | | | | | | | | | (567) | | | | | | | | | | | | (568) | | | | | | | | | | | | (569) | | | | | | | | | | | | (570) | | | | | | | | | | | | (571) | | | | | | | | | | | | (572) | | | | | | | | | | | | (573) | | | | | | | | | | | | (574) | | | | | | | | | | | | (575) | | | | | | | | | | | | (576) | | | | | | | | | | | | (577) | | | | | | | | | | | | (578) | | | | | | | | | | | | (579) | | | | | | | | | | | | (580) | | | | | | | | | | | | (581) | | | | | | | | | | | | (582) | | | | | | | | | | | | (583) | | | | | | | | | | | | (584) | | | | | | | | | | | | (585) | | | | | | | | | | | | (586) | | | | | | | | | | | | (587) | | | | | | | | | | | | (588) | | | | | | | | | | | | (589) | | | | | | | | | | | | (590) | | | | | | | | | | | | (591) | | | | | | | | | | | | (592) | | | | | | | | | | | | (593) | | | | | | | | | | | | (594) | | | | | | | | | | | | (595) | | | | | | | | | | | | (596) | | | | | | | | | | | | (597) | | | | | | | | | | | | (598) | | | | | | | | | | | | (599) | | | | | | | | | | | | (600) | | | | | | | | | | | |
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| Horizontal (x) Axis (E541) | | | | | | | | | | | | Vertical (y) Axis (E542) | | | | | | | | | | | | # Lines per plot (E543) | | | | | | | | | | | | Enter N, D, M or Y* (E544) | | | | | | | | | | | | Enter Z if PRT is to be factored (E545) | | | | | | | | | | | | Kind of time (E546) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Origin For plots 7 & 8 Y (time in years) enter 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 M (time in months) enter 13-31 may be blank E541: 13-31 may be blank | | | | | | | | | | | | Increment Length (characters) of axis | | | | | | | | | | | | Origin Length (characters) of axis | | | | | | | | | | | | # Lines per plot | | | | | | | | | | | | Enter N, D, M or Y* | | | | | | | | | | | | Enter Z if PRT is to be factored | | | | | | | | | | | | Kind of time H → hours D → days M → months Y → years must agree with entry in 00 27 of TABLE 8 card | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLOT 7 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLOT 8 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLOT 9 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PLOT 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| <p>Fleming, Marilyn V. Beach Profile Analysis System (BPAS). Volume V. BPAS user's guide: analysis module BEACH / by Marilyn V. Fleming and Timothy J. Lawler.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.</p> <p>[65] p. ill. ; 27 cm.--(Technical report / Coastal Engineering Research Center; no. 82-1 v.(V)). Cover title.</p> <p>An eight-volume package of computer programs for editing, analyzing, and displaying beach profile survey data is presented consisting of an overview of the Beach Profile Analysis System, two editing programs, five analysis programs, and supporting appendices. The primary design is for use on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.</p> <p>1. Data processing. 2. Beach Profile Analysis System. 3. Beach profile changes. 4. Computer programs. I. Lawler, Timothy J. II. Title. III. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-1, v.V. TC203 .U581tr no. 82-1, v.V 627</p> | <p>Fleming, Marilyn V. Beach Profile Analysis System (BPAS). Volume V. BPAS user's guide: analysis module BEACH / by Marilyn V. Fleming and Timothy J. Lawler.--Fort Belvoir, Va. : U.S. Army, Corps of Engineers, Coastal Engineering Research Center ; Springfield, Va. : available from NTIS, 1982.</p> <p>[65] p. ill. ; 27 cm.--(Technical report / Coastal Engineering Research Center; no. 82-1 v.(V)). Cover title.</p> <p>An eight-volume package of computer programs for editing, analyzing, and displaying beach profile survey data is presented consisting of an overview of the Beach Profile Analysis System, two editing programs, five analysis programs, and supporting appendices. The primary design is for use on the CDC 6600 computer, although much of the coding was done in standard FORTRAN for use on other systems.</p> <p>1. Data processing. 2. Beach Profile Analysis System. 3. Beach profile changes. 4. Computer programs. I. Lawler, Timothy J. II. Title. III. Series: Technical report (Coastal Engineering Research Center (U.S.)); no. 82-1, v.V. TC203 .U581tr no. 82-1, v.V 627</p> |
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